PALOUSE BASIN AQUIFER committee

August 18, 2022

## RE: Adoption of the Final Report of the "Palouse Groundwater Basin Water Supply Alternatives Report"

Since its formation, the Palouse Basin Aquifer Committee (PBAC) has identified and studied a number of potential water supply alternatives. In 2020, PBAC commissioned Alta Science & Engineering, Inc. to further refine four water supply alternatives and generate recommendations for the best way to move forward toward project implementation. Alta presented their draft findings at the PBAC Workshop on July 28, 2022.

At the workshop, PBAC voted to recommend focusing efforts on the "Modified Alternative 4" project. This project has three main elements:

1) **Paradise Creek Moscow Direct Use** – This project element consists of a new Paradise Creek diversion near Moscow. Surface water would be pumped from a diversion intake structure and conveyed through a pipeline, and includes a pump station and water treatment plant. The treated water would then be conveyed through the existing distribution system to Moscow/UI for direct use.

2) **South Fork Palouse River Pullman Direct Use** – This project element consists of a new South Fork of the Palouse River diversion near Pullman. Surface water would be pumped from a diversion intake structure and conveyed through a pipeline, and includes a pump station and water treatment plant. The treated water would then be conveyed through the existing distribution system to Pullman/WSU for direct use.

3) **Additional Conservation** – This project element entails increasing conservation resulting in an additional 15% savings from the baseline projection.

The other alternatives are still viable options and will be kept in the background as further refinement occurs with "Modified Alternative 4". The Committee recognizes the complexities of the goal at hand – to find a long-term, quality water supply for the Palouse Basin region. Any alternative requires next step investigation findings, community leadership support, and robust public involvement. Next steps may present obstacles as well as opportunities not known at this time (e.g., a cost-effective pumped storage concept by a local utility). By keeping the other alternatives and their varying project elements in mind, the Committee ensures flexibility during next steps while not losing forward momentum.

PBAC will adopt the attached final report at their August 18, 2022, meeting. After which, each member of PBAC will update and obtain feedback with their respective leadership groups. This will kick off a broader outreach process to the public over the next few months and into next year.

Alta Science & Engineering, Inc.

# FINAL REPORT

Prepared For:
Palouse Basin Aquifer Committee

## Palouse Groundwater Basin Water Supply Alternatives Report

Jacobs

SPF WATER ENGINEERING

McCORMICK WATER STRATEGIES


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## Acronyms and Abbreviations

| | |
|---|---|
| Alta | Alta Science & Engineering, Inc. |
| AR | aquifer recharge |
| ASR | aquifer storage and recovery |
| IDFG | Idaho Department of Fish & Game |
| IDWR | Idaho Department of Water Resources |
| IWRB | Idaho Water Resource Board |
| Ecology | Washington Department of Ecology |
| ENR CCI | Engineering News-Record Construction Cost Index |
| NEPA | National Environmental Policy Act |
| NMFS | National Marine Fisheries Service |
| O&M | operations and maintenance |
| PBAC | Palouse Basin Aquifer Committee |
| SEG | Stakeholder Engagement Group |
| SEPA | State (Washington) Environmental Policy Act |
| UI | University of Idaho |
| USFWS | U.S. Fish & Wildlife Service |
| WDFW | Washington Department of Fish and Wildlife |
| WSU | Washington State University |
| WTP | water treatment plant |
| WWTP | wastewater treatment plant |

## Units

| | |
|---|---|
| AF | acre feet |
| $/AF | cost per acre foot |
| MGY | millions of gallons of water per year |
| MG | millions of gallons |

# Executive Summary

The Palouse Groundwater Basin is the sole source of drinking water for the communities of Moscow, Idaho; Pullman, Washington; and Palouse, Washington; as well as the University of Idaho (UI) and Washington State University (WSU). Water is obtained from the deeper of two aquifers (lower aquifer), which has a current rate of water-level decline of 0.77 feet per year. Although the rate of decline has decreased over the last 30 years, the aquifer level continues to drop as the demand exceeds supply.

In response to declining water levels in 2017, PBAC determined the target water supply for the Palouse Basin for the next 50 years and identified four preliminary water supply alternatives to help meet the future demand and stabilize groundwater levels. These four alternatives include:

1. **Snake River Diversion**: surface water diverted and conveyed to a treatment plant. Treated water would be conveyed to Pullman and Moscow for direct use. Alternative 1 is estimated to provide 85% of the water supply target.
2. **Paradise Creek or South Fork Palouse River:** surface water diverted and conveyed to a treatment plant. Treated water would be used to recharge the aquifer in Moscow. **North Fork Palouse River:** surface water diverted and conveyed to a treatment plant. Treated water would be conveyed to Pullman and Moscow for direct use. Alternative 2 is estimated to provide 82% of the water supply target.
3. **South Fork Palouse River:** surface water diverted and conveyed to a treatment plant. Treated water would be conveyed to Pullman for direct use. **Flannigan Creek:** constructing a reservoir and diverting the stored water to Moscow for direct use after treatment. Alternative 3 is estimated to provide 100% of the water supply target.
4. **South Fork Palouse River:** surface water diverted and conveyed to a treatment plant. Treated water would be used to recharge the aquifer in Pullman. **Paradise Creek**: surface water diverted and conveyed to a treatment plant. Treated water would be used to recharge the aquifer in Moscow. **Pullman Wastewater Reuse**: Class A reclaimed water used for irrigation in Pullman. **Moscow Wastewater Reuse:** Class A reclaimed water used for passive aquifer recharge in Moscow. **Additional water conservation**: a 15% increase in conservation. Alternative 4 is estimated to provide 81% of the water supply target.

In 2020, PBAC commissioned this current work to refine the four water supply alternatives and distill them into to one or two alternatives that can help meet future demand, stabilize aquifer levels, and have the greatest opportunity of successfully being implemented. The process of refinement included conducting public outreach, filling water rights data gaps, identifying fatal flaws with water rights and fisheries, developing interim steps and evaluating the alternatives, and investigating a funding strategy.

### Outreach

Outreach was a significant component of the alternatives refinement process which included an outreach plan, campaign, awareness polling, posting on social media, funding a Palouse Basin revisioning tool thesis project, formulating and engaging with a Stakeholder Engagement Group, engaging with the state agencies, and presenting to special-interest groups.

The outreach activities are raising awareness in the community and within the agencies. It is organically growing given the late stage of this project as more people become aware with increasing interest. State and tribal agency engagement with this project is helping identify processes and concerns, and keeps them apprised of the project.

### Water Rights Investigation

Acquiring sufficient water rights is a key component to the water supply alternative implementation. The legal availability of water appears to be present with the alternatives based on the preliminary water rights investigations (Snake River was not included in the investigation). The alternatives require new water rights because there are insufficient existing water rights available to purchase to fulfill the supply target.

### Water Rights and Fisheries Fatal Flaws Evaluation

The alternatives refinement investigation did not reveal any fatal flaws during the water rights investigation. However, Nez Perce tribal water rights claims in the Palouse Basin in Idaho, if approved, could potentially impact water availability for the projects with water from Idaho.

The alternatives refinement investigation did not reveal any fatal flaws in discussions with the various state and fisheries agencies. State fisheries agencies expressed concerns with the smaller water bodies having sufficient availability to meet both flows for aquatic needs and needs of the water supply alternative. The agencies need to review this report and provide comments to PBAC soliciting discussions for next steps.

### Interim Steps

The four alternatives were divided into interim steps to provide a mechanism for implementing larger projects in phases over time, offering flexibility to adapt with the water supply needs and funding. During this process a new Modified Alternative 4 is introduced to replace Alternative 4. Modified 4 is more cost effective and incorporates feedback from the public.

- **Modified Alternative 4 - South Fork Palouse River:** surface water diverted and conveyed to a treatment plant. Treated water would be conveyed to Pullman for direct use. **Paradise Creek**: surface water diverted and conveyed to a treatment plant. Treated water would be conveyed to Moscow for direct use. **Additional water conservation**: a 15% increase in conservation. Modified Alternative 4 is estimated to provide 80% of the water supply target.

There is no clear front-runner water supply alternative. A decision matrix is therefore used to compare the alternatives and rank them. The ranking order from highest to lowest is Modified 4, 3, 2, and 1.

Alternative 1 has the highest capital cost, operations and maintenance (O&M) cost, and total present value cost per acre foot of annual supply. It ranks the lowest in the decision matrix. This alternative had preliminary favor with the state fisheries agencies due to the volume of water in the river compared to the proposed withdrawal amounts.

Modified Alternative 4 had the lowest capital cost, O&M cost, and total present value cost per acre foot of annual supply. It ranks highest in the decision matrix. This option has the lowest reliability of water availability. Until instream flows are determined, it is unknown whether there is sufficient physical availability of water as determined by the state fisheries agencies.

### Funding Strategies

There are opportunities for funding the alternatives. Upon selection of an alternative and governance structure, a funding strategy can and must be developed. The strategy is likely to include a blend of funds and revenue that will need to consider the communities' ability-to-pay, revenue sources, and external funding sources.

### Recommendations

Alta recommends moving forward with Modified Alternative 4 (highest rank) followed by either Alternative 3 (second highest rank) or Alternative 1. The purpose of bringing two alternatives along is to continue with forward progress in the event a fatal flaw is found, or a significant change is needed with Modified Alternative 4 (ex. insufficient water supply). The recommendation is to focus attention and resources on the selected one to two alternatives for further technical and non-technical refinement. The other alternatives are still viable and may be considered, should findings from the refinement process indicate the need.

Alta recommends a water utility rate study to evaluate community affordability. The outcome may help determine the preferred alternative.

### Near-Term Next Steps

The near-term next steps include dissemination of this report, developing consensus amongst PBAC members on an alternative(s) to focus attention and resources, developing a plan to further refine this alternative(s), and having discussions with community leaders, state and tribal agencies, and the public. Outcomes of the discussions reaching critical decision points which form the foundation of the project include selection of the alternative(s) to move forward, governance, funding strategy, agreements, and planning documents.

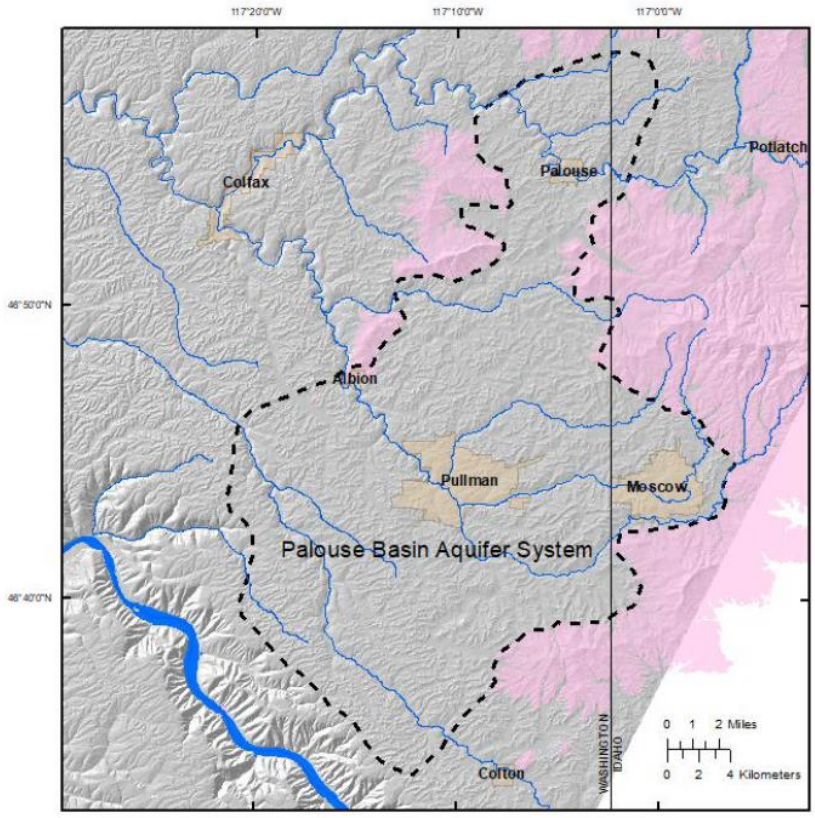
# Section 1 Introduction

The Palouse Groundwater Basin is the sole source of drinking water for the communities of Moscow, Idaho; Pullman, Washington; and Palouse, Washington; as well as the University of Idaho (UI) and Washington State University (WSU). The Basin covers a small portion of western Idaho with the bulk of the Basin in eastern Washington (Figure 1). In addition, hundreds of residences obtain water from the basin in rural Latah and Whitman counties. The cities and universities obtain water from the deeper of two aquifers (i.e., Grande Ronde Aquifer, lower aquifer).

Water levels in the lower aquifer have declined over time. Although the rate of decline has decreased over the last 30 years to the current rate of decline (0.77 feet per year), the current aquifer withdrawals are not sustainable. Therefore, the communities need a supplementary water supply to stabilize aquifer levels and allow for future growth.

The Palouse Basin Aquifer Committee (PBAC) hired Alta Science and Engineering, Inc. (Alta) and their team from Jacobs, McCormick Water Strategy, and SPF Water Engineering to refine the top four water supply alternatives developed in 2017 by conducting outreach activities, filling water rights data gaps, developing project phases, and investigating potential financing. The purpose of this report is to present the findings and to identify the most viable options for a sustainable water supply for the Basin.

**Figure 1. Working Boundary of the Palouse Basin Aquifer System (Columbia River Basalt Group (gray), pre-Columbia River Basalt Group basement rocks (pink) (Bush et al. 2022).**



The remainder of the report is structured as follows:

**Section 2 – Background** summarizes the water supply alternatives from 2017 (Anchor QEA et al.).

**Section 3 – Outreach** describes the outreach plan and outreach conducted.

**Section 4 – Water Rights Data Gap Filling** summarizes the water rights investigation for Idaho and Washington related to the water supply alternatives.

**Section 5 – Fisheries Agencies Discussions** summarizes conversations with the national and state fisheries agencies.

**Section 6 – Water Supply Alternatives Interim Steps** describes potential interim steps for each alternative and the updated costs.

**Section 7 – Water Supply Alternatives Matrix and Ranking** presents the decision matrix and subsequent ranking of each alternative.

**Section 8 – Funding Strategy Development** summarizes potential funding sources and planning information.

**Section 9 – Conclusions** provides conclusions on the water supply alternatives.

**Section 10 – Recommendations** provides recommendations on the water supply alternatives.

**Section 11 – Next Steps** presents the next steps of the process to advance a water supply alternative.

# Section 2 Background – Previous Water Supply Investigation

From 1958 to 2013, various agencies (ex. Moscow, Pullman, US Army Corps of Engineers) investigated and developed approximately 38 water supply alternative options for the Palouse Basin. From 2015 to 2017, PBAC developed the regional supplemental water supply target, reviewed and evaluated the existing water supply alternative project options, developed updated alternative project costs, and developed the top alternatives to move forward in the next project phase (Anchor QEA 2017). The 2017 report contains the following two main outcomes:

- The Palouse basin needs an estimated supplemental supply target of 2,324 millions of gallons per year (MGY) to stabilize the aquifer levels and meet future water use demand
- There are four potentially viable water supply alternatives that could stabilize aquifer levels and meet the future water-use demand

This work is summarized below and detailed in the 2017 report.

## 2.1 Supplemental Supply Target

The 2017 report indicates the Palouse Basin needs an additional 2,324 million gallons per year to meet future demand and stabilize the aquifer level. This volume of water is referred to as the supplemental supply target. The regional supplemental supply target incorporates a future need component and an aquifer stabilization component broken out as:

- Future need (1,588 MGY): Estimated water demands incorporating historical and average 2013-2015 water use and a projected need in 50 years with a population growth of 1% with the current level of conservation.

- Aquifer stabilization (735 MGY): Estimated to be the average 2013 – 2015 basin irrigation amounts. Although the stabilization value is not known, the rate of water level decline has been decreasing over the last 30 years. The aquifer stabilization volume offset is expected to reduce the rate of decline and may stabilize aquifer water levels.

The communities are expected to continue pumping groundwater. Table 1 is a summary of the projected supplemental supply target and Palouse Groundwater Basin demands.

**Table 1. Summary of Projected Palouse Groundwater Basin Demands (Anchor QEA et al. 2017).**

| Year/Type of Demand | Moscow (MGY) | Pullman (MGY) | WSU (MGY) | UI (MGY) | Palouse (MGY) | Total (MGY) | Total (AF) |
|---|---|---|---|---|---|---|---|
| **Baseline Demands (2013-2015 average)** | | | | | | | |
| Irrigation | 241 | 278 | 153 | 46 | 17 | 735 | 2,256 |
| Non-Irrigation[1] | 623 | 637 | 322 | 106 | 40 | 1,728 | 5,304 |
| Total | 864 | 915 | 475 | 152 | 57 | 2,464 | 7,561 |
| **Baseline Projection (Existing Baseline with Currently Projected Conservation + 1% Annual Growth)** | | | | | | | |
| 2065[2] | 1,422 | 1,505 | 781 | 250 | 94 | 4,052 | 12,434 |
| 50-year Projected Increase[3] | 557 | 590 | 306 | 98 | 37 | 1,588 | 4,874 |
| Aquifer Stabilization[4] | 241 | 278 | 153 | 46 | 17 | 735 | 2,256 |
| Supplemental Supply Target[5] | 798 | 868 | 459 | 143 | 54 | **2,324** | 7,130 |

[1]Average use November – February

[2]50-year projection total need

[3]Projected increase is the difference between the 2065 projected demand and the baseline demand.

[4]Aquifer stabilization is equal to the estimated baseline irrigation demand.

[5]Supplemental supply target is equal to the projected increase plus the aquifer stabilization amount.

## 2.2 Water Supply Alternatives

PBAC's consultant reviewed 38 water supply alternatives projects. They formulated and analyzed the alternatives using a matrix. Four alternatives rose to the top as the most viable projects. The 2017 report describes the evaluation criteria and methods including lifecycle cost analysis assumptions, modeling uncertainty and risk, cost and schedule uncertainty, and yield uncertainty. Table 2 lists the top four alternatives and percent of the water supply target.

**Table 2. 2017 Report Water Supply Alternatives.**

| Alternative Number | Alternative Description | % of Projected Basin 50-Year Demand |
|---|---|---|
| 1 | **Snake River Diversion:** surface water pumped and conveyed to treatment plant near Pullman. Treated water conveyed to Pullman and Moscow for direct use. | 85 |
| 2 | **Paradise Creek or South Fork Palouse River:** surface water pumped and conveyed to treatment plant in Moscow. Treated water injected into aquifer recharge wells in Moscow.<br>**North Fork Palouse River:** surface water pumped and conveyed to treatment plant north of Pullman. Treated water conveyed to Pullman and Moscow for direct use. | 82 |
| 3 | **South Fork Palouse River:** surface water pumped and conveyed to treatment plant near Pullman. Treated water conveyed to Pullman for direct use.<br>**Flannigan Creek:** dam, reservoir stored water pumped and conveyed to treatment plant near Moscow. Treated water conveyed to Moscow for direct use. | 100 |
| 4 | **South Fork Palouse River:** surface water pumped and conveyed to treatment plant near Pullman. Treated water conveyed to Pullman for active injection in aquifer storage and recovery (ASR).<br>**Paradise Creek:** surface water pumped and conveyed to treatment plant in Moscow. Treated water injected into aquifer recharge wells in Moscow.<br>**Pullman wastewater reuse:** Class A reclaimed water pumped to new water reuse system for irrigation at reuse sites in Pullman.<br>**Moscow wastewater for infiltration:** Class A reclaimed water discharged to shallow infiltration area to enhance recharge of the upper aquifer.<br>**Conservation:** a 15% increase in conservation. | 81 |

PBAC's consultant also conducted follow-on work and filled data gaps. This work is documented in the following memoranda:

- Draft Water Rights Evaluation – February 2018 (Anchor QEA 2018a)
- Ecology and IDWR meeting summary – April 2018 (Anchor QEA 2018b)
- North Fork Palouse River Surface Water Treatability – February 2018, October 2019 (Anchor QEA and HDR 2018; HDR 2019a)
- Clearwater Alternative – November 2019 (HDR 2019b)
- Fisheries Agencies correspondence documentation –October 2019, February 2020 (Anchor QEA 2019a, b)
- Endangered Species Act permitting and strategy development – February 2020 (Anchor QEA 2020)

# Section 3 Outreach

PBAC recognizes the importance of community engagement with the water supply alternatives. The purpose of conducting outreach is to educate the public about their drinking water source and the need for a water supply alternative, provide details about the alternatives, and gather and incorporate input and feedback. This section describes the outreach planning and documents the outreach activities performed from 2021 to 2022. The outreach is raising awareness in the community and within the agencies. It is organically growing given the late stage of this project, as more people become aware, and with increasing interest.

## 3.1 Outreach Plan

To enhance outreach success, Alta prepared an outreach plan specifically for the water supply alternatives. Appendix A contains the Outreach Plan. Objectives include identifying key stakeholders, leadership roles and responsibilities, and communication methods; developing a foundation of content for outreach presentations, general schedule, and feedback loop; and establishing metrics to ensure progress will be made.

Outreach is an important component of the water supply alternatives refinement and is in alignment with PBAC's overarching organizational goals listed below from PBAC's Communication Action Plan (DH 2017):

1. Build community awareness and understanding of the Palouse Basin's groundwater supply.
2. Engage the community and build public support of and involvement in PBAC's mission to ensure a quality, long-term water supply.
3. Strengthen PBAC's reputation and credibility as the Palouse Basin Groundwater Authority.

The goals of outreach activities during the water supply alternatives refinement process are to inform, educate, solicit, incorporate feedback, and gain informed consent for a selected alternative(s).

## 3.2 Outreach Campaign

PBAC developed an outreach campaign booklet that was used for developing outreach materials and as a blueprint for PBACs social media campaign. Outreach planning efforts resulted in development of the tag line, "Conserve, Stabilize, Thrive." The booklet also describes the social media campaign and provides a "how-to". Appendix B contains the "Conserve, Stabilize, Thrive" campaign booklet.

## 3.3 PBAC Awareness Poll

PBAC developed a Palouse Basin Awareness Poll in fall 2021 using a Google polling platform. The purpose of the poll was to:

- Gain understanding of public knowledge of the aquifers and water conservation
- Better understand how residents access information on water matters
- Better shape messaging and effectively use social media

- Increase community engagement through PBAC's "Conserve, Stabilize, Thrive" campaign

The poll was open from September 8 – October 8, 2021. Poll advertising occurred on PBAC's website and social media, the cities' websites, during outreach presentations, and in a press release in the Moscow-Pullman Daily News.

A total of 306 people took the poll and answered 18 questions. Poll outcomes included:

- 82% of participants live in Moscow or Pullman.
- Participant age ranges varied widely with the under 18 years old making up the smallest age group with the remaining age groups distributed somewhat evenly. Nearly 60% of participants were female. 58% of participants were employed full time, and nearly 90% have some college or a graduate degree.
- Over 125 participants through social media; the other sources were each mentioned by fewer than 50 participants.
- 72% of participants knew about PBAC and 80% know their water is sourced from groundwater, and about 82% know water levels in the lower aquifer are declining.
- 84% of participants believe they either use an average or below average amount of water in comparison to others.
- 95% of participants expressed water conservation is important to them. 66% of the participants said they were either aware of the cities' water conservation programs or expressed interest in learning about them.
- 52% of respondents said they want to be more involved in water matters.
- Comments ranged from wanting to know how much water is left, to concerns about water use, to new developments, to appreciation for the work PBAC is doing.

Appendix C contains the PBAC Awareness Poll Findings summary document.

## 3.4 Social Media

PBAC created Facebook, Instagram, and Twitter accounts in March of 2021. Within the last year of having the social media accounts, they went from zero followers on Twitter to 27 followers, zero followers on Instagram to 128, and 90 followers on Facebook to 200. Appendix D contains the social media analytics through February 28, 2022.

From March 2021 to July 2021, PBAC posted three times a week on Instagram, Twitter, and Facebook to gain traction quickly. From August to October, they switched to posting once weekly on each platform to create consistency for their audience. In November and December 2021 PBAC had just finished the Google poll (described in 3.3), so they posted less frequently to ensure they and the stakeholders had time to review the poll results and decide how to share them.

The accounts growth plateaued after the poll but started to show steady increase with consistent weekly posts. PBAC continues posting on each platform a few times per month.

One of the key takeaways of the PBAC awareness poll (Section 3.3) is that people are interested in conservation, so that is what they structured the content around in January and February 2022 where they went back to the once weekly for each platform with conservation content.

Results from the PBAC awareness poll suggest the majority of residents get PBAC information through social media. Social media tools appear to be an effective method for spreading awareness, although this was bias to the feedback from only the polling population.

## 3.5 Palouse Basin Revisioning Tool

PBAC funded Lauren Kirkpatrick's master's thesis project at Washington State University to gain insight in better visual tools for outreach. Her thesis title is *Improving Public Perceptions of Water Resource Policies Through the Use of Online Simulations and Visual Design* (Kirkpatrick 2022). Lauren updated a previous web-based model called the Palouse Basin Revisioning Tool. The Revisioning Tool provided information on hydrogeology, the Palouse Basin aquifers, the water supply alternatives, and conservation. Lauren provided two web-based interfaces for users and then solicited feedback on the interfaces. She also asked viewers which of the four alternatives they preferred. The preferred alternative was Alternative 4 (Modified Alternative 4 was not available at the time of the study). The full results of the study are provided in her thesis.

## 3.6 Stakeholder Engagement Group

PBAC established a charter for a Stakeholder Engagement Group (SEG) in 2020 and launched the SEG in early 2021. The SEG's purpose is to provide input to PBAC through dialogue among a broad range of interested parties focusing mainly on the four water supply alternatives and associated engineering and environmental evaluations and analyses, research activities, and public involvement efforts. Input from the SEG plays a critical role in public engagement and helps guide outreach activities.

Currently SEG has approximately 15 members representing a variety of backgrounds and interests, although more people are invited to participate if they are interested. The group met in February 2021, April 2021, and February 2022. PBAC and Alta presented progress updates to the group, generating dialogue. The SEG recommended developing a tag line, which resulted in the "Conserve, Stabilize, Thrive" campaign described in Section 3.2. PBAC will continue to engage with the SEG throughout the water supply alternatives progress.

## 3.7 Entity Engagement

Alta regularly provided project updates at the PBAC meetings where representatives from the Washington Department of Ecology (Ecology) and the Idaho Department of Water Resources (IDWR) attended. In addition, they met with other agencies throughout the project.

**Washington Department of Ecology**

PBAC and Alta's team met with staff from Ecology on June 7, 2021 to provide an update on the project and to solicit feedback. Appendix E provides a summary of this discussion. Ecology made it clear that the Agency follows the recommendations on physical availability of water from the Washington Department of Fish and Wildlife (WDFW). Ecology recommended the team meet with state and national fisheries agencies to gather insight and identify potential concerns regarding the water supply alternatives. Section 5 describes the meetings held with PBAC, Alta's team, the National Marine Fisheries Service (NMFS), US Fish and Wildlife (USFW), WDFW, and Idaho Department of Fish and Game (IDFG).

PBAC and Alta again met with Ecology staff (Brook Beeler, Patrick Cabbage, Chris Beard, Stephanie May, and Jamie Short) on April 7, 2022 to provide an update on the fisheries meetings and alternatives refinement. Ecology stated ASR is easier to permit than direct use

and reiterated the water supply alternative must meet the legal and physical availability of water as defined by the state.

**Idaho Water Resource Board**

PBAC provided project updates to Neely Miller at the Idaho Water Resource Board (IWRB) approximately every other month. The purpose was to update the Board on the progress of the water supply alternatives project, milestones, outreach, polling results, and PBAC governance. Feedback was positive with the progress made and the project remains on their list for upcoming water supply projects needing funding.

**Congressional Delegates**

PBAC had discussions with state and federal congressional delegates. They met with Washington and Idaho federal delegations as well as state legislators from WA District 9 and Idaho District 5/6 over the duration of the project. These were general conversations about the size and scope of the water supply alternative projects and that federal and state funding would need to be part of any water supply project.

**Nez Perce Tribe**

The Nez Perce Tribe's aboriginal territory extends into the Palouse Basin. PBAC and Alta's team also met with members/staff of the Nez Perce Tribe on January 25, 2022 with Ken Clark (head of the Water Resources Department), Allison Lebeda (water rights), Emmit Taylor (fisheries), and Bobby Hills (fisheries) to discuss the status of the Palouse Basin water levels and water supply alternatives. They didn't identify any major concerns during the call but stated that they would like to continue being engaged and have an opportunity to review documents related to future environmental assessments.

## 3.8 Other Outreach Conducted

To further PBAC's goal of engaging with the community on the water supply alternatives, PBAC and Alta presented water supply alternative project updates at the following events throughout the duration of this project. Many of these were advertised in the Moscow-Pullman Daily News:

- PBAC Leadership Roundtable – September 2021
- American Water Resources Association Washington Section Conference – October 2021
- Palouse Basin Water Summit – October 2021
- Moscow League of Women Voters – November 2021
- Moscow Finance Committee (Poll results) - January 2022
- Pullman City Council (Poll results) – February 2022
- Moscow League of Women Voters – March 2022
- Pullman League of Women Voters – April 2022
- Whitman County Realtor's Association – May 2022

### 3.9 Community Feedback

Feedback received from during outreach through the variety of methods (personal communications, meetings, emails, a PBAC poll, and opinions in the local newspaper) resulted in three primary concerns that include:

1. The rapid increase in land development and the increase in population growth further taxing the aquifer.
2. Potential negative impacts of emerging contaminants by injecting treated surface water into the aquifer, despite the water being treated to drinking water standards.
3. The length of time to implement an alternative. They want to see continued progress.

## Section 4 Water Rights Data Gap Filling

Additional water rights are needed for any of the water supply alternatives to be viable. Our team investigated water rights on surface water bodies related to the water supply alternatives in Idaho and Washington. The team examined existing water rights; looked for opportunities, constraints, fatal flaws; and investigated implications of claims in the Palouse Basin Adjudication in Idaho.

Idaho water rights investigation key takeaways:

- The entities can seek new water appropriations or purchase existing water rights.
- Existing water rights do not pose significant constraints.
- PBAC's water supply goals likely exceed existing surface water rights.
- Recommend PBAC seek new appropriations by applying for a water right permit
- Tribal minimum streamflow claims are pending in the Palouse Basin Adjudication. This will potentially impact the Idaho alternatives.
- Monitoring the claim negotiation process is recommended.

Washington water rights investigation key takeaways:

- PBAC can seek new water appropriations or purchase existing water rights.
- For new appropriations, water availability is limited to demonstrating biological needs are met.
- Existing appropriations:
    - Snake River: transfer from willing sellers is limited to Lower Granite Pool and upstream into OR and ID (note that evaluation of existing Snake River water rights and assessment of water acquisition feasibility was not conducted).
    - Other surface water sources: transfer from willing sellers, may require upstream sellers.
    - Estimated cost to purchase existing water rights is $3,000 – $5,000 per acre-feet (AF)/year.
- PBAC's water supply goals exceed existing surface water rights for Alternatives 2-4, on paper.
- Acquisition of water rights may rank higher than new water right appropriations.

- Transactional certainty is higher with existing water rights.
- Biological consultation and reliance on negotiated water availability for new appropriations has more challenges.

Appendix F contains the Idaho water rights investigation and Washington water rights investigation memoranda. The estimated costs in the Washington water rights memorandum assume all of the water can be purchased, but in reality, there are insufficient water rights to purchase and new water rights would still be needed.

# Section 5 Fisheries Agencies Discussions

PBAC and Alta's team met with four fisheries agencies to engage in preliminary discussions regarding the supplementary water supply alternatives. The purpose was to identify areas of concern not previously identified. Our team met with staff from the following agencies:

- National Marine Fisheries Service (NMFS)
- U.S. Fish and Wildlife Service (USFWS)
- Washington Department of Fish and Wildlife (WDFW)
- Idaho Department of Fish and Game (IDFG)

Based on discussions with the services (NMFS and USFWS) and the state (WDFW and IDFG), capturing flows directly from the Snake River is preferred, followed by Flannigan Creek. From the services perspective, their preference is based on the volume of flows being proposed for use as contributing to less reduced relative volume and reduced thermal concerns for fish. WDFW and IDFW were more specific in their concerns related to meeting instream flow requirements and that sufficient flows, with instream flow requirements in place, may not be available in any alternative with the exception of Alternative 1 and possibly Alternative 3B (Flannigan Creek). Appendix G contains details of the fisheries agencies' discussions.

# Section 6 Water Supply Alternatives Interim Steps

Breaking down the water supply alternatives into interim steps provides a mechanism for implementing larger projects in phases over time. Implementing in phases provides flexibility to adapt with the water supply needs and funding. All four of the 2017 alternatives were refined into possible interim steps for this report. This refinement provides updated costs and schedules for the four alternatives.

The next subsections describe the interim steps, costs, and schedule. Details of the original alternatives can be found in the 2017 report. Appendix H contains the *Water Supply Alternatives Interim Steps Technical Memorandum* including a description of the phases, capital costs and schedule, and the *Water Supply Phased Alternatives – Annual Operations and Maintenance (O&M) Cost Allocations* memorandum which describes the annual O&M.

During the alternative refinement process and after submission of the interim steps memoranda, Alta developed a Modified Alternative 4 project with interim steps. Modified Alternative 4 is described in the following subsections.

## 6.1 Alternatives and Phases Descriptions

Alternatives 1 and 2 have project components that are interconnected whereas Alternatives 3, 4, and Modified 4 have distinct project components. Each alternative interim step has a number

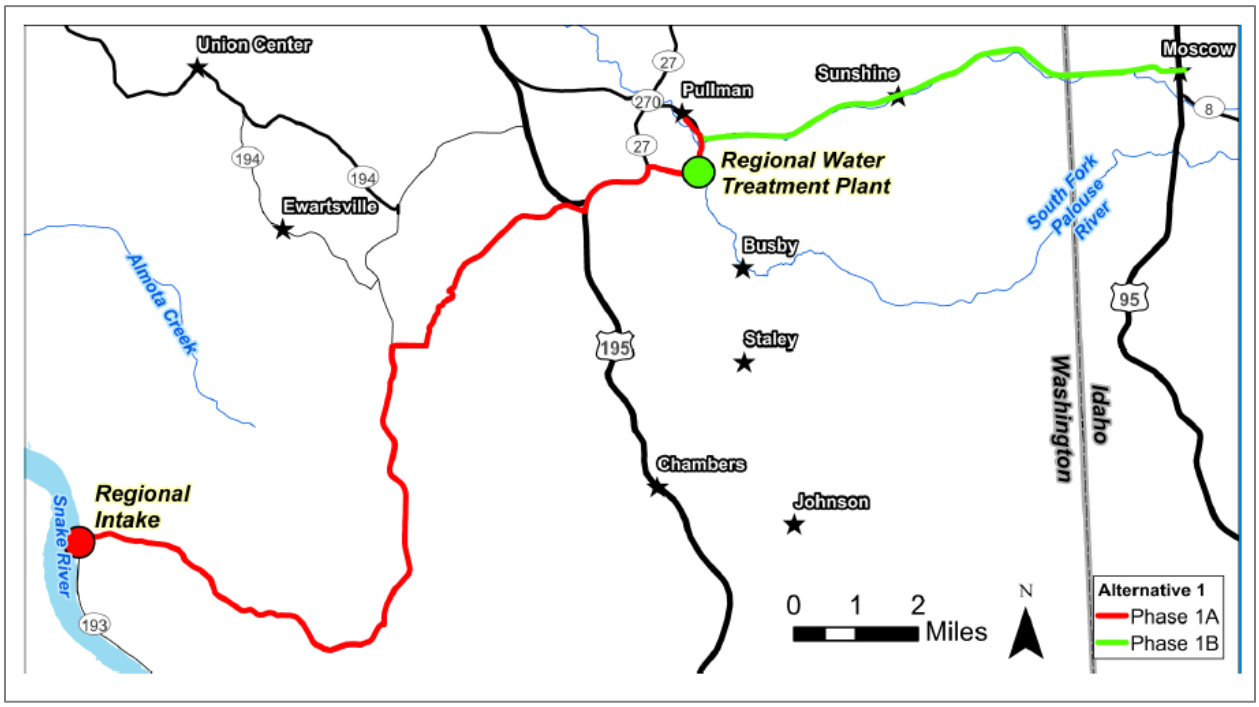
and letter designation (ex. Phase 1A) representing the alternative number and phase letter. The phases are grouped into bid packages to allow similar construction work to be bid and constructed by contractors that specialize in that type of work. Assigning bid packages also allows for a greater degree of flexibility for design, bid, and construction where one bid package can be advanced more quickly for construction work that can and/or needs to occur earlier while other design and construction requires more time or needs to occur later once the early construction is completed. The bid packages have an alpha numeric designator as well, aligned with the phased alternative. Appendix H provides a description of bid packages for each alternative.

Alternatives 1, 2, 3, and Modified 4 have phases with direct use, meaning treated water from the water treatment plant is conveyed to the distribution system in the communities. Because the water supply alternatives target is based on a 50-year plan, all the water planned for the alternative may not be used until a later time when the population grows and demand increases. The benefit to ASR and aquifer recharge is the ability to store/recharge the water in the aquifer. In addition, the amount of water supplied to a community is not proportional. The idea is any offset from groundwater pumping helps the Basin as a whole. For example, Alternative 3 is estimated to provide 100% of the targeted design amount for the Basin, yet Phase 3B Flannigan Creek will supply more water for Moscow/UI than the South Fork Palouse River will for Pullman/WSU.

### 6.1.1 Alternative 1 – Snake River: Pullman/Moscow

Figure 2 shows the Alternative 1 phasing.

**Figure 2. Alternative 1 Phasing**




Note exact locations for the diversion, pipelines, and water treatment plant will be vetted if the alternative moves forward.

Alternative 1 consists of a new Snake River diversion from the Lower Granite Dam pool anticipated near Wawawai in Washington. Surface water is pumped from a diversion intake

structure and conveyed through approximately 25 miles of pipeline, and includes five pump stations, four storage tanks, and a treatment plant near Pullman. The treated water is then conveyed to Pullman/WSU and Moscow/UI for direct use in their existing water distribution systems.

Although Alternative 1 is one distinct project, there are two phases identified.

- **Phase 1A** consists of the system to the water treatment plant with conveyance to Pullman/WSU's distribution system. The pumps and water treatment plant would be constructed, and equipment installed to accommodate the first portion of design flow and to allow for capacity in the second phase.
- **Phase 1B** consists of flow and treatment expansions to the pump stations and water treatment plant, and conveyance system (pump station and pipeline) to Moscow/UI's distribution system. The supply amounts are assumed to be even for both communities.

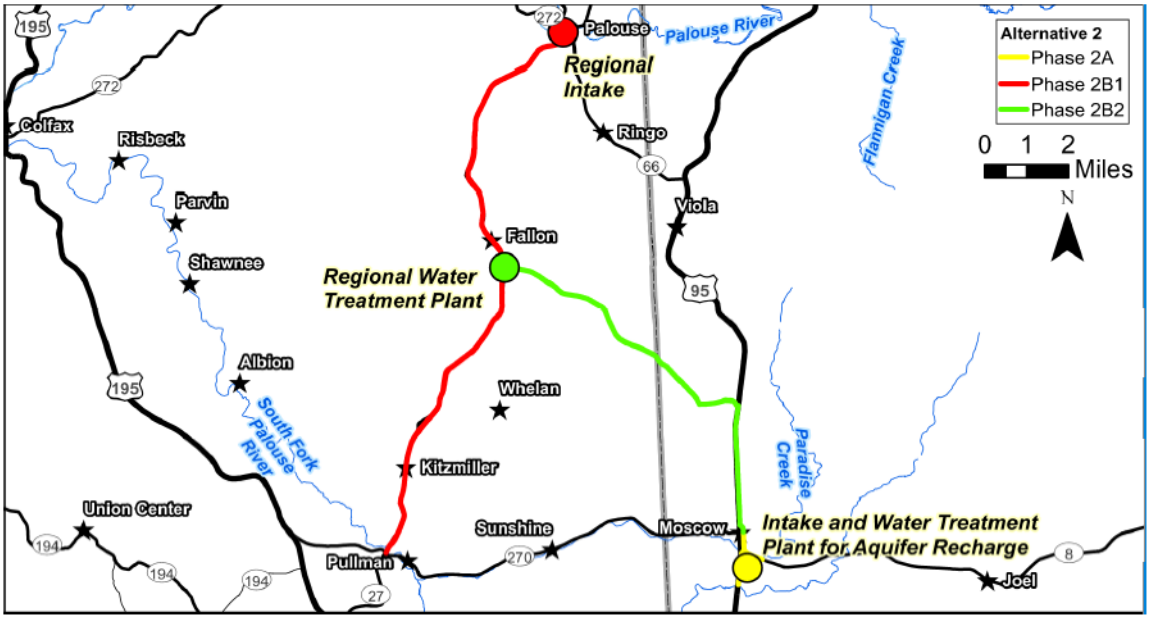
A local utility company is currently conducting a business case evaluation of a possible new off-channel pumped storage reservoir and hydropower facility that would be located along the Snake River. If a utility project were to be implemented, it presents the potential to benefit Alternative 1 by reducing the costs, potentially making Alternative 1 less expensive than other alternatives.

Idaho Congressman Mike Simpson, the tribes, and others had proposals that would result in the breaching of dams on the Snake River, including Lower Granite Dam, which would affect the river level at the proposed diversion site for Alternative 1. If Lower Granite Dam was breached, the alternative is still expected to be viable, but the diversion pipeline elevation would likely be lowered (i.e., a longer pipeline).

### 6.1.2 Alternative 2 – South Fork Palouse River/Paradise Creek: Moscow; North Fork Palouse River: Pullman/Moscow

Figure 3 shows the Alternative 2 phasing.

**Figure 3. Alternative 2 Phasing**



Note exact locations for the diversions, pipelines, and water treatment plants will be vetted if the alternative moves forward.

Alternative 2 consists of two distinct project elements, which could be implemented in any order or concurrently.

A. **South Fork Palouse River or Paradise Creek Moscow Aquifer Recharge** – This project consists of a new South Fork of the Palouse River or Paradise Creek diversion near Moscow. Surface water is pumped from a diversion intake structure and conveyed through a pipeline, and includes a pump station and water treatment plant. The treated water is then injected into the upper or lower aquifers via recharge well(s).

B. **North Fork Palouse River Pullman/Moscow Direct Use** – This project entails a new North Fork of the Palouse River diversion anticipated near Palouse, Washington. Surface water is pumped from a diversion intake structure and conveyed through a pipeline, and includes two pump stations, one storage tank, an energy recovery system, and water treatment plant anticipated between Palouse and Pullman. The treated water is then conveyed to Pullman/WSU and Moscow/UI for direct use in their existing water distribution systems.

Alternative 2A is not divided further given it is a discrete project, although there is an opportunity to phase the construction of the water treatment plant and recharge wells if there is a strategic reason to do so.

Alternative 2B may be implemented in two phases.

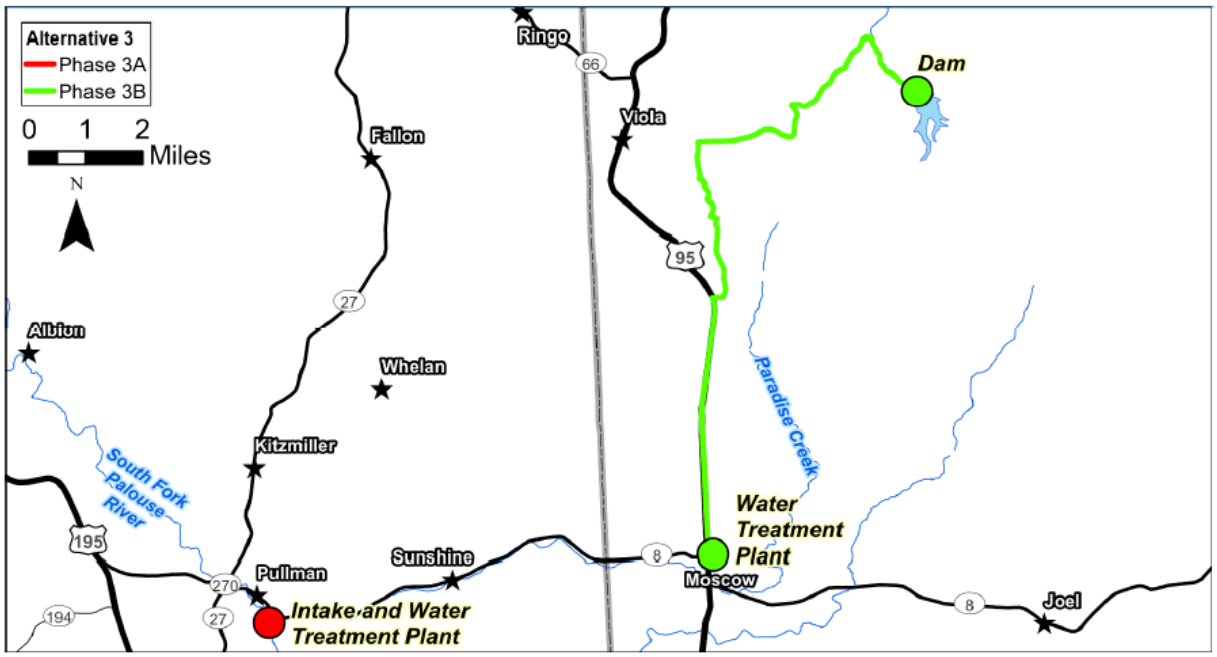
- **Phase 2B1**
  - River intake and pump station
  - Conveyance to the WTP
  - The WTP
  - Conveyance system for water delivery to Pullman/WSU's distribution system
- **Phase 2B2**
  - Increasing pumping capacity at the intake pump station
  - Increasing treatment capacity at the WTP
  - Increasing pumping capacity for conveyance to Moscow
  - Conveyance system for water delivery to Moscow/UI's distribution system

The supply amounts are assumed to be even for both communities.

### 6.1.3 Alternative 3 – South Fork Palouse River: Pullman; Flannigan Creek Storage Reservoir: Moscow

Figure 4 shows the Alternative 3 phasing.

**Figure 4. Alternative 3 Phasing**




Note exact locations for the diversions, pipelines, dam, and water treatment plants will be vetted if the alternative moves forward.

Alternative 3 consists of two distinct project elements, which could be implemented in any order or concurrently.

A. **South Fork Palouse River Pullman Direct Use –** This project consists of a new South Fork of the Palouse River diversion near Pullman. Surface water is pumped from a diversion intake structure and conveyed through a pipeline, and includes a pump station and water treatment plant. The treated water is then conveyed to Pullman/WSU for direct use in their existing water distribution systems.

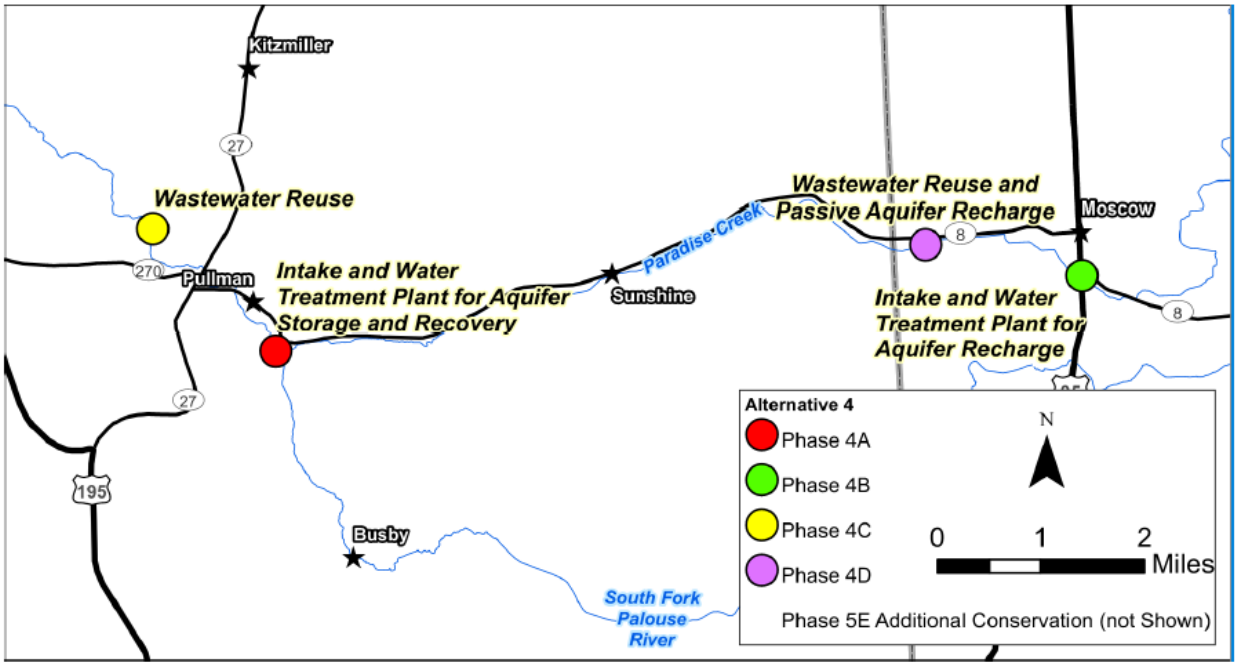
B. **Flannigan Creek Storage Reservoir Moscow Direct Use** – This project consists of a new Flannigan Creek reservoir. Water in Flannigan Creek is stored behind a new 102-foot-tall dam creating 6,600 AF of storage. This project includes a reservoir outlet works, two pump stations, one storage tank, approximately 13 miles of pipeline, energy reduction in-line hydropower generation facility, a water treatment plant, and conveyance to Moscow/UI for direct use in their existing water distribution systems.

Alternative 3 does not contain any further phasing of these two projects.

### 6.1.4 Alternative 4 – Paradise Creek: Moscow; South Fork Palouse River: Pullman; Wastewater Reuse: Pullman and Moscow; Additional Conservation

Figure 5 shows the Alternative 4 phasing.

**Figure 5. Alternative 4 Phasing**




Note exact locations for the diversions, pipelines, and water treatment plants will be vetted if the alternative moves forward.

Alternative 4 consists of five distinct project elements, which could be implemented in any order or concurrently.

A. **Paradise Creek Moscow Aquifer Recharge –** This project consists of a new Paradise Creek diversion near Moscow. Surface water would be pumped from a diversion intake structure and conveyed through a pipeline, and includes a pump station and water treatment plant. The treated water would then be injected into the upper or lower aquifers via recharge well(s) for aquifer recharge.

B. **South Fork Palouse River Pullman ASR –** This project consists of a new South Fork of the Palouse River diversion near Pullman. Surface water would be pumped from a diversion intake structure and conveyed through a pipeline, and includes a pump station and water treatment plant. The treated water would then be injected into the aquifer via recharge well(s) for aquifer storage and recovery.

C. **Pullman Wastewater Reuse –** This project entails using treated wastewater for Pullman/WSU irrigation. It includes an upgrade to the Pullman Wastewater Treatment Plant to produce Class A reclaimed water, reclaimed water pump station, storage tank, and distribution pipes.

D. **Moscow Wastewater Reuse –** This project entails using treated wastewater for passive recharge into the upper aquifer. It includes upgrades to the Moscow Wastewater

Treatment Plant to produce Class A reclaimed water, reclaimed water pump station, conveyance pipeline, and infiltration basins for passive infiltration.

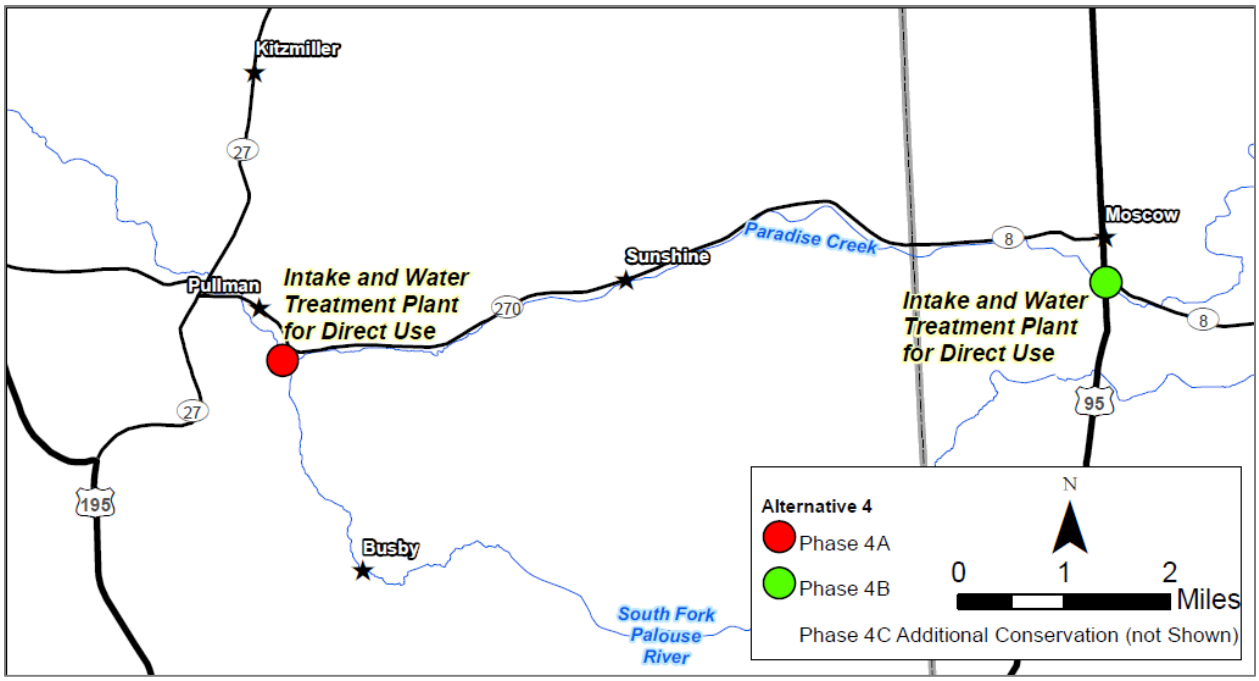
E. **Additional Conservation –** This project entails increasing conservation resulting in an additional 15% savings from the baseline projection. Conservation measures may include those listed in the Moscow Conservation Plan and Pullman and WSU Water System Plans as well as measures yet to be determined.

Alternative 4 does not contain any further phasing of these five projects.

### 6.1.5 Modified Alternative 4 – Paradise Creek: Moscow; South Fork Palouse River: Pullman; Additional Conservation

Figure 6 shows the Modified Alternative 4 phasing.

**Figure 6. Modified Alternative 4 Phasing**




Note exact locations for the diversions, pipelines, and water treatment plants will be vetted if the alternative moves forward.

Alta further evaluated Alternative 4 to determine potential options for increasing the supply, reducing the cost, and incorporating feedback from the public and agencies. This evaluation resulted in a Modified Alternative 4. The high cost, relatively small water supply, and concerns of South Fork Palouse River in-stream summer flows in Pullman by the WDFW resulted in the removal of the wastewater reuse options (Alternatives 4C and 4D). Based on feedback PBAC received from the public regarding concerns over the injection of treated surface water (see Section 3.9), Alternatives 4A (Paradise Creek Moscow) and 4B (South Fork Palouse River Pullman) are modified for direct use. Based on the current use, all the water planned for the alternative may not be used until a later time when the population grows and demand increases unless a storage option is introduced. In modifying Alternative 4, the South Fork Palouse River Pullman phase has an increased supply, the same as Alternative 3A. This addition addresses the supply gap from removing the wastewater reuse options. Table 3 shows the estimated supply. The Modified Alternative 4 consists of three distinct project elements, which could be

implemented in any order or concurrently. ASR or aquifer recharge could still be an option for one or both of the phases in the future.

A. **Paradise Creek Moscow Direct Use –** This project consists of a new Paradise Creek diversion near Moscow. Surface water would be pumped from a diversion intake structure and conveyed through a pipeline, and includes a pump station and water treatment plant. The treated water would then be conveyed through the existing distribution system to Moscow/UI for direct use.

B. **South Fork Palouse River Pullman Direct Use –** This project consists of a new South Fork of the Palouse River diversion near Pullman. Surface water would be pumped from a diversion intake structure and conveyed through a pipeline, and includes a pump station and water treatment plant. The treated water would then be conveyed through the existing distribution system to Pullman/WSU for direct use.

C. **Additional Conservation –** This project entails increasing conservation resulting in an additional 15% savings from the baseline projection. Conservation measures may include those listed in the Moscow Conservation Plan and Pullman and WSU Water System Plans as well as measures yet to be determined.

Modified Alternative 4 does not contain any further phasing of these three projects.

## 6.2 Alternatives and Phases Costs

Alta's team evaluated the Water Supply Alternative costs provided in the 2017 report. The costs were dissected into the interim steps (phases) and updated to May 2021 dollars. Costs were escalated through application of the Engineering News-Record Construction Cost Index (ENR CCI) numbers to account for inflation and other market price adjustments.

Modified Alternative 4 was developed after the interim steps and O&M memoranda in Appendix H were finalized. The only change to the remaining alternative phases is the direct use of water instead of aquifer recharge for Paradise Creek. The cost was not expected to differ significantly for these phases. A summary of the capital and O&M costs are described below. Appendix H contains details of these costs.

### *6.2.1 Capital Costs*

Water supply alternatives capital costs include:

- capital construction
- contingency
- engineering
- permitting
- water rights
- property acquisition is not included unless otherwise stated

Engineering judgement was used to determine portions of the phased facility costs (e.g., Water Treatment Plant). In addition, there are two changes and additions to the costs in the 2017 report.

1. Increasing the engineering allowance from 15% in the original report to 25%.

2. Adding the cost for environmental permitting, estimated at about 25% of the engineering cost.

The costs associated with water rights are from the 2017 report indexed to 2021 dollars. The Washington water rights memorandum in Appendix F estimated costs were not used because 1) costs were only developed for alternatives in Washington and 2) the costs assume there are sufficient water rights to purchase. Table 3 shows the interim steps and updated capital costs.

### 6.2.2 Operating and Maintenance Costs

Water supply alternative costs also include O&M costs. These include materials and energy, equipment maintenance, and operational labor. The cost escalation from 2016 to 2021 is 14.9%.

The water treatment plant O&M costs are apportioned between two phases (e.g., Alternative 1 and 2B).

- 85% of the O&M cost applied to the Phase 1 operations
- 15% of the O&M cost applied to the follow-on Phase II operations

***For example*** - **Alternative 1** would have 85% of the O&M appropriated to the Pullman operations (Phase 1), with the remaining 15% appropriated to the later build out to Moscow (Phase I). A majority of the site and water treatment infrastructure would be in place following completion of Phase I construction, thereby requiring a substantial portion of the total O&M costs to run the facility. When the Phase II treatment capacity increases are implemented, additional staff will be required, and additional utility expenses will be incurred.

Pump station O& M costs were apportioned between the initial Phase 1 operations and follow-on Phase II increased pumping operations.

Table 3 shows the interim steps 2021 present value costs, using 50 years as the number of time periods.

### 6.2.3 Interim Steps Cost Comparison

This section presents the comparison of costs as well as costs versus supply.

Figure 7 is a chart of the capital costs. From most expensive to least expensive, capital costs are ranked:

1. Alternative 4 (most expensive)
2. Alternative 1
3. Alternative 3
4. Alternative 2
5. Modified Alternative 4

**Table 3. Supply and Costs for the Water Supply Alternatives Phases**

| | | | | | Estimated Supply and % Demand | | | 2021 Cost Escalation & Recalculated | | | | Present Value of Costs (2021) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alternative # | Phase # (Matching Phase #) | Project Type | Project Title | Project Description | Estimated Annual Supply (MG)[1] | Estimated Annual Supply (AF) | % of Projected Palouse Basin 50-yr Demand[3] | Capital Cost to Implement ($) | % of Alternative Capital Cost | Capital Cost to Implement ($/AF of Annual Supply) | Annual Operating Cost[4] ($) | Present Value of Annual Operating Costs[4] ($) | Total Present Value (Capital Cost + Annual Operating Cost) ($) | Total Present Value ($/AF of Annual Supply) |
| 1 | | Surface Water Alternative | Snake River (Pipeline to Pullman and Moscow) Direct Use | Direct diversion from Snake River; Surface water pumped and conveyed to treatment; Treated surface water delivered to Pullman and Moscow potable water system | 1,967 | 6,040 | 85% | $ 109,851,689 | | $ 18,187 | $ 6,044,000 | $ 293,398,000 | $ 403,249,689 | $ 66,763 |
| | 1A | | WTP, Pipeline to Pullman | | 984 | 3,020 | 42% | $ 88,780,510 | 81% | $ 29,398 | $ 3,980,000 | $ 193,204,000 | $ 281,984,510 | $ 93,372 |
| | 1B | | WTP expansion, Pipeline to Moscow | | 983 | 3,020 | 42% | $ 21,071,179 | 19% | $ 6,977 | $ 2,064,000 | $ 100,194,000 | $ 121,265,179 | $ 40,154 |
| | | | | | | | | | | | | | | |
| | 2A | Aquifer Recharge | Moscow: Paradise Creek and/or South Fork Palouse River AR | AR with in-city surface water diversion; Treatment; Active injection of treated water in Moscow AR wells during spring runoff | 358 | 1,100 | 15% | $ 19,218,829 | 25% | $ 17,472 | $ 773,000 | $ 37,524,000 | $ 56,742,829 | $ 51,584 |
| | 2B | Surface Water Alternative | Pullman & Moscow: North Fork Palouse River Direct Use | Direct diversion from NF Palouse River in WA; Surface water pumped and conveyed to treatment north of Pullman; Treated water conveyed to both City of Pullman and City of Moscow potable water systems | 1,550 | 4,760 | 67% | $ 57,768,786 | 75% | $ 12,136 | $ 1,674,000 | $ 81,262,000 | $ 139,030,786 | $ 29,208 |
| | 2B1 | | WTP, Pipeline to Pullman | | 775 | 2,380 | 33% | $ 43,656,490 | 76% | $ 18,343 | $ 1,264,000 | $ 61,359,000 | $ 105,015,490 | $ 44,124 |
| | 2B2 | | WTP expansion, Pipeline to Moscow | | 775 | 2,380 | 33% | $ 14,112,296 | 24% | $ 5,930 | $ 410,000 | $ 19,903,000 | $ 34,015,296 | $ 14,292 |
| **2** | **Total** | | | | **1,908** | **5,860** | 82% | **$ 76,987,615** | | | **$ 2,447,000** | | **$ 195,773,615** | **$ 33,408** |
| | | | | | | | | | | | | | | |
| | 3A | Surface Water Alternative | Pullman: SF Palouse River Direct Use | Direct Diversion Using Winter/Spring Runoff Direct Diversion from SF Palouse River; Treatment; Delivery to City of Pullman Water System during late winter and spring runoff | 894 | 2,743 | 38% | $ 28,776,452 | 27% | $ 10,491 | $ 864,000 | $ 41,942,000 | $ 70,718,452 | $ 25,781 |
| | 3B | Surface Water Alternative | Moscow: Flannigan Creek/reservoir Direct Use | Flannigan Creek; Reservoir stored water pumped and conveyed to treatment; Treated water discharged directly to City of Moscow potable water system | 1,430 | 4,400 | 62% | $ 76,239,792 | 73% | $ 17,327 | $ 3,152,000 | $ 153,010,000 | $ 229,249,792 | $ 52,102 |
| **3** | **Total** | | | | **2,324** | **7,143** | 100% | **$ 105,016,244** | | | **$ 4,016,000** | | **$ 299,968,244** | **$ 41,995** |
| | | | | | | | | | | | | | | |

**Table 3. Supply and Costs for the Water Supply Alternatives Phases**

| Alternative # | Phase # (Matching Phase #) | Project Type | Project Title | Project Description | Estimated Supply and % Demand | | | 2021 Cost Escalation & Recalculated | | | | Present Value of Costs (2021) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Estimated Annual Supply (MG)[1] | Estimated Annual Supply (AF) | % of Projected Palouse Basin 50-yr Demand[3] | Capital Cost to Implement ($) | % of Alternative Capital Cost | Capital Cost to Implement ($/AF of Annual Supply) | Annual Operating Cost[4] ($) | Present Value of Annual Operating Costs[4] ($) | Total Present Value (Capital Cost + Annual Operating Cost) ($) | Total Present Value ($/AF of Annual Supply) |
| | 4A | ASR | Pullman: SF Palouse River ASR | ASR Using Winter/Spring Runoff Diversion from SF Palouse River; Treatment; Active injection of treated water during late winter and spring runoff | 358 | 1,100 | 15% | $ 19,219,029 | 16% | $ 17,472 | $ 773,000 | $ 37,524,000 | $ 56,743,029 | $ 51,585 |
| | 4B | Aquifer Recharge | Moscow: Paradise Creek AR | Aquifer Recharge Using Winter/Spring Runoff Direct Diversion from Paradise Creek; Treatment; Active injection of treated water in Moscow Aquifer recharge wells | 358 | 1,100 | 15% | $ 19,219,029 | 16% | $ 17,472 | $ 773,000 | $ 37,524,000 | $ 56,743,029 | $ 51,585 |
| | 4C | Water Reuse | Pullman/WSU: Waste Water Reuse Project | Water Reuse Project WWTP Upgrades, Class A reclaimed water supply pumped to new water reuse system for irrigation at reuse sites in Pullman | 148 | 454 | 6% | $ 53,022,538 | 44% | $ 116,790 | $ 205,000 | $ 9,951,000 | $ 62,973,538 | $ 138,708 |
| | 4D | Passive AR | Moscow Waste Water Infiltration | Water Reuse for Infiltration Class A recycled water from Moscow WWTP discharged to shallow infiltration area to enhance Wanapum aquifer groundwater storage | 420 | 1,300 | 18% | $ 4,089,164 | 3% | $ 3,146 | $ 87,000 | $ 4,223,000 | $ 8,312,164 | $ 6,394 |
| | 4E | Conservation Measures | Moscow Conservation Measures | Sum of all conservation measures from the 2015 Moscow Conservation Plan | 104 | 319 | 4% | $ 25,772,446 | 21% | $ 13,789 | | | $ 25,772,446 | $ 13,789 |
| | | Conservation Measures | Pullman Conservation Measures | Sum of all conservation measures from the 2014 Pullman Water System Plan | 9 | 27 | 0% | | | | | | | |
| | | Conservation Measures | WSU Conservation Measures | Sum of all conservation measures from the 2008 WSU Water System Plan | 14 | 43 | 1% | | | | | | | |
| | | Conservation Measures | | Other conservation (calculated so conservation = 609 MGY) | 482 | 1,480 | 21% | | | | | | | |
| **4** | **Total** | | | | **1,893** | **5,823** | 81% | **$ 121,322,206** | | | | | **$ 210,544,206** | **$ 36,157.34** |
| | | | | | | | | | | | | | | |
| | Mod 4A (3A) | Surface Water Alternative | Pullman: SF Palouse River Direct Use | Direct Diversion Using Winter/Spring Runoff Direct Diversion from SF Palouse River; Treatment; Delivery to City of Pullman Water System during late winter and spring runoff | 894 | 2,743 | 38% | $ 28,776,452 | 39% | $ 10,491 | $ 864,000 | $ 41,942,000 | $ 70,718,452 | $ 25,781 |
| | Mod 4B (Modified 2A) | Surface Water Alternative | Paradise Creek - Moscow | NEW - Direct Use | 358 | 1,100 | 15% | $ 19,218,829 | 26% | $ 17,472 | $ 773,000 | $ 37,524,000 | $ 56,742,829 | $ 51,584 |
| | Mod 4C (4E) | Conservation Measures | Moscow Conservation Measures | Sum of all conservation measures from the 2015 Moscow Conservation Plan | 104 | 319 | 4% | $ 25,772,446 | 35% | $ 13,789 | | | $ 25,772,446 | $ 13,789 |
| | | Conservation Measures | Pullman Conservation Measures | Sum of all conservation measures from the 2014 Pullman Water System Plan | 9 | 27 | 0% | | | | | | | |
| | | Conservation Measures | WSU Conservation Measures | Sum of all conservation measures from the 2008 WSU Water System Plan | 14 | 43 | 1% | | | | | | | |
| | | Conservation Measures | | Other conservation (calculated so conservation = 609 MGY) | 482 | 1,480 | 21% | | | | | | | |
| **Mod 4** | **Total** | | | | **1,861** | **5,712** | 80% | **$ 73,767,727** | | | | | **$ 153,233,727** | **$ 26,826.63** |

## Table 3. Supply and Costs for the Water Supply Alternatives Phases

| | | | | | Estimated Supply and % Demand | | | 2021 Cost Escalation & Recalculated | | | | Present Value of Costs (2021) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alternative # | Phase # (Matching Phase #) | Project Type | Project Title | Project Description | Estimated Annual Supply (MG)[1] | Estimated Annual Supply (AF) | % of Projected Palouse Basin 50-yr Demand[3] | Capital Cost to Implement ($) | % of Alternative Capital Cost | Capital Cost to Implement ($/AF of Annual Supply) | Annual Operating Cost[4] ($) | Present Value of Annual Operating Costs[4] ($) | Total Present Value (Capital Cost + Annual Operating Cost) ($) | Total Present Value ($/AF of Annual Supply) |

Notes:

Base table from Anchor QEA et al. (2017)

1. Estimated annual supply is the amount of additional water supply that will reliably (at least 50% of the time) be made available by implementing the proposed project.
2. The average annual yield is the estimated average annual yield of the watershed captured by a proposed reservoir or tributary to a proposed diversion location.
3. The projected demand used as a basis for comparison are projected demands without additional conservation. Local system demand includes just the projected demand for the local system that would receive most or all of the water supply.
4. No annual operating costs were provided in Anchor QEA et al. (2017) for conservation and thus none were moved forward in this study.
5. Total Present Value was calculated using n=50 years.

AF: acre-feet
ASR: aquifer storage and recovery
AR = aquifer recharge
MG: million gallons
MGY: million gallons per year
NF: north fork
SF: south fork
WSU: Washington State University
WWTP: wastewater treatment plant
WTP: water treatment plant

**Figure 7. Capital Cost for the Water Supply Alternatives.**

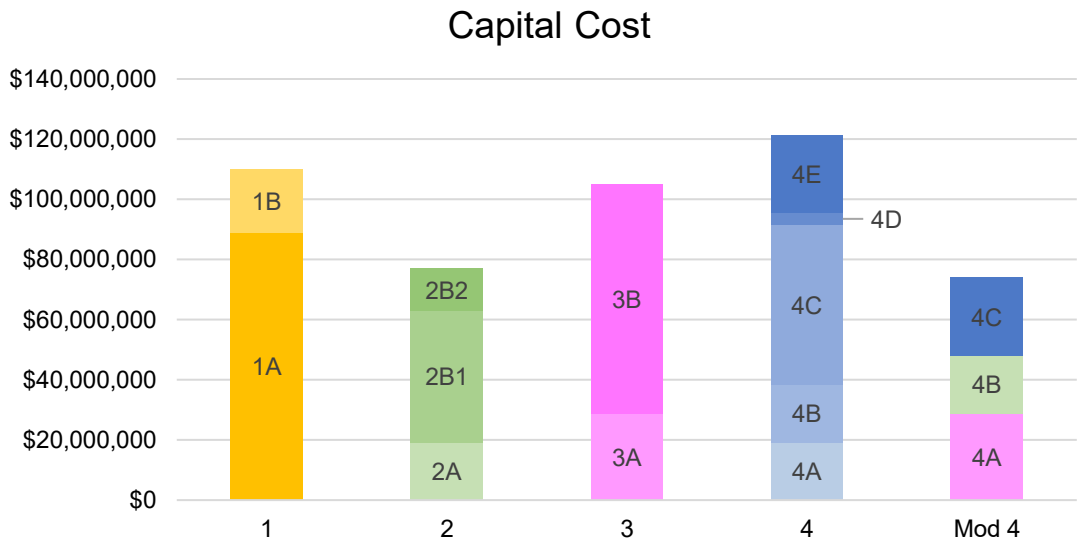



Figure 8 is a compilation of total capital cost versus anticipated design supply graphs for each alternative. The alternative phases with the greatest return on cost for supply are listed first. These graphs allow a comparison showing which alternatives and phases can be implemented with the lowest cost. Alternative Phases 2A and 4B (both South Fork Palouse River or Paradise Creek Moscow) are the lowest cost.

Table 3 is a chart of the annual O&M costs. From most expensive to least expensive, O&M costs are ranked:

1. Alternative 1 (most expensive)
2. Alternative 3
3. Alternative 2
4. Alternative 4
5. Modified Alternative 4

**Figure 8. Graphs of Capital Cost Versus Anticipated Supply Amounts for Each Water Supply Alternative.**

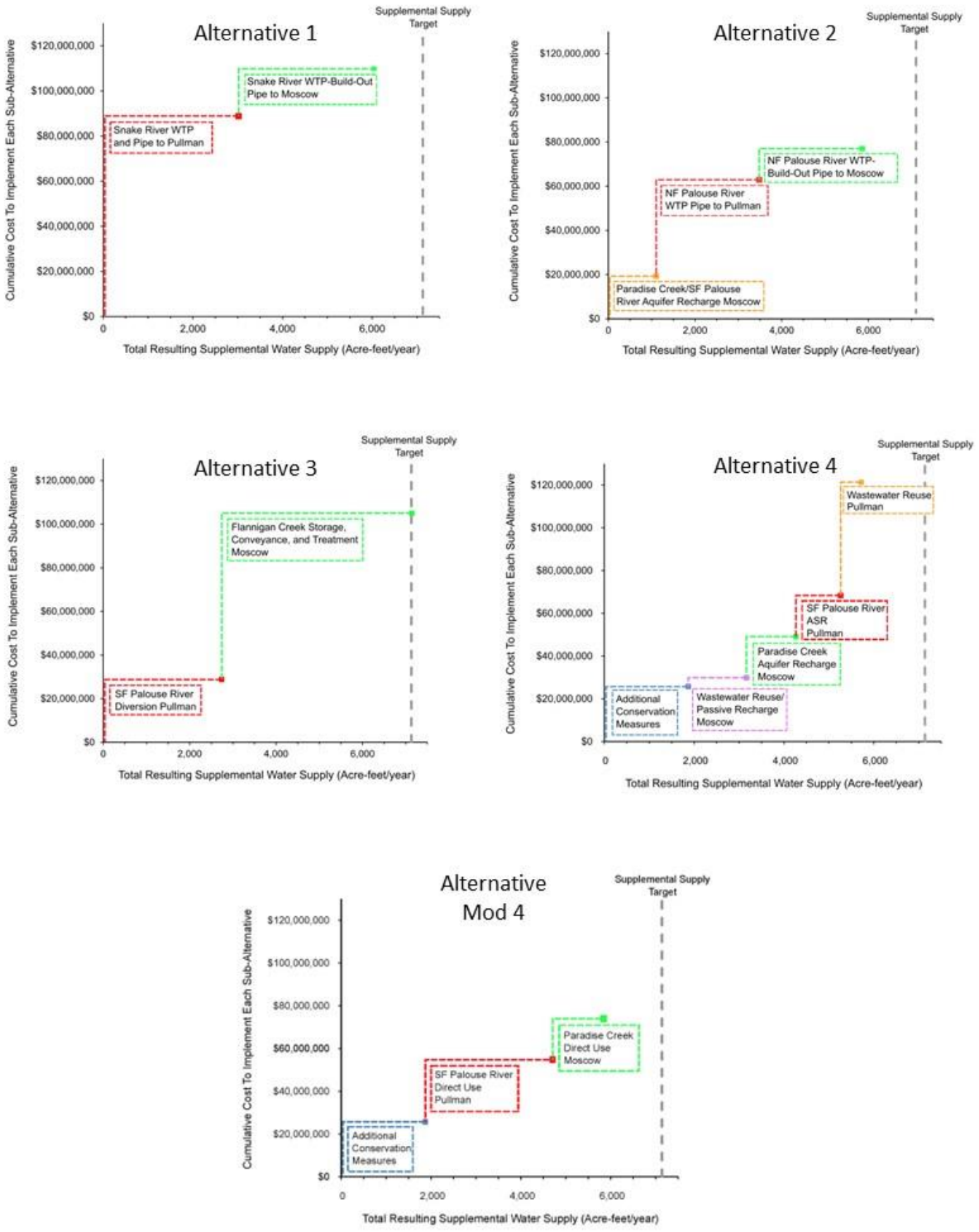
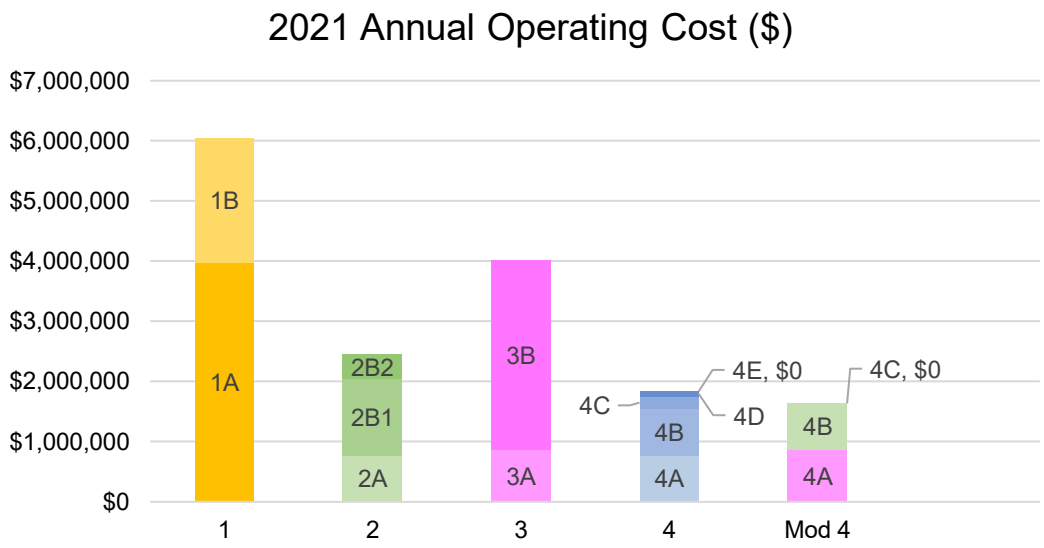


**Figure 9. Annual O&M Costs for the Water Supply Alternatives.**

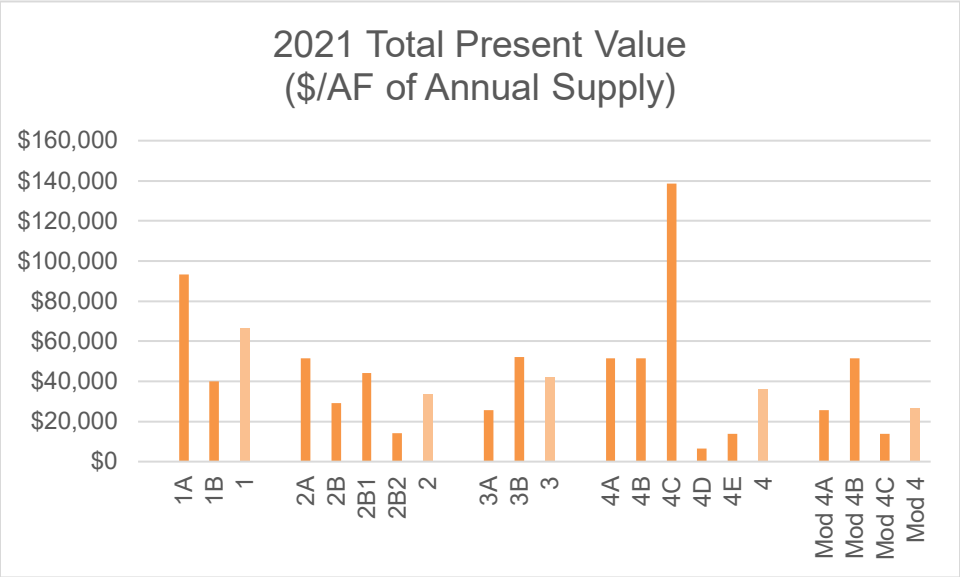



Total capital costs and annual O&M costs are incorporated into the 2021 total present value cost per acre foot ($/AF). Figure 10 is a chart of 2021 total present value cost per AF of annual supply for each alternative and interim step or phase. The costs are not additive for each alternative and is the reason for separating the interim steps from the alternative as a whole. For the main alternatives, from most expensive to least expensive, the ranking is:

1. Alternative 1 (most expensive)
2. Alternative 3
3. Alternative 4
4. Alternative 2
5. Modified Alternative 4

For the alternative phases, 4C (Pullman Wastewater Treatment Plant [WWTP] reuse) and 1A (Snake River – diversion to Pullman) were the highest cost per AF, whereas Alternative Phase 4D (Moscow WWTP passive recharge) had the lowest cost per AF, followed by 4C (South Fork Palouse River or Paradise Creek Moscow) and 2B2 (NF Palouse River to Moscow).

**Figure 10. 2021 Total Present Value $/AF of Annual Supply for Each Water Supply Alternative and Interim Step.**




## 6.3 Phased Project Implementation Activities and Durations

Implementation activities are identified for each project phase and given a project duration. These activities are based on engineering experience and judgement, and are listed below.

- Pre-construction Funding
- Construction Funding Commitment
- Water Rights Acquisition
- Water Quality Data Collection
- Feasibility / Route Study / Site Selection (5%)
- Preliminary Environmental Review
- MOA and Land/Easement Acquisition
- Survey/Bathymetry and Geotechnical Field Work
- Preliminary Design (30%)
- National Environmental Policy Act (NEPA) / State (Washington) Environmental Policy Act (SEPA) / EID
- Secure Final Funding
- Final Design
- Permitting
- Bid / Award / Contracting
- Equipment / Material Manufacturing & Delivery
- Construction

- Facility Start-up and Operations

The first ten activities are considered preliminary work and occur prior to the bid packages. This sets the stage prior to the phased alternatives. Some of these activities have linkages and dependencies while others do not.

Preliminary work for each alternative is estimated to be six years. Excluding additional conservation, total project durations range from 11 to 12 years if all interim steps are implemented concurrently. Table 4 lists the approximate project durations.

**Table 4. Water Supply Alternatives Project Durations Summary**

| Alternative # | Alternative Description | Estimated Years to Implement |
|---|---|---|
| 1 start | Preliminary Work Prior to Bid Packages: Stage set for either 1A or 1B | 6 |
| 1A | Snake River: Diversion, WTP, Conveyance to Pullman | 6 |
| 1B | Snake River: Conveyance to Moscow | 3 |
| | Minimum Total Years | 12 |
| 2A | Paradise Creek/South Fork Palouse River: Diversion, WTP, Aquifer Recharge in Moscow | 12 |
| 2B start | Preliminary Work Prior to Bid Packages: Stage set for either 2B1 or 2B2 | 6 |
| 2B1 | North Fork Palouse River: Diversion, WTP, Conveyance to Pullman | 6 |
| 2B2 | North Fork Palouse River: Conveyance to Moscow | 3 |
| | Minimum Total Years | 12 |
| 3A | South Fork Palouse: Diversion, WTP, Conveyance to Pullman | 11 |
| 3B | Flannigan Creek: Diversion, Storage, WTP, Conveyance to Moscow | 11 |
| 4A | South Fork Palouse: Diversion, WTP, ASR in Pullman | 11 |
| 4B | Paradise Creek: Diversion, WTP, aquifer recharge in Moscow | 12 |
| 4C | Water Reuse Pullman | 9 |
| 4D | Water Reuse Passive Recharge Moscow | 9 |
| 4E | Additional Conservation | 6 |
| Mod 4A | South Fork Palouse: Diversion, WTP, Conveyance to Pullman | 11 |
| Mod 4B | Paradise Creek: Diversion, WTP, Conveyance to Moscow | 12 |
| Mod 4C | Additional Conservation | 6 |

AR = aquifer recharge
ASR = aquifer storage and recovery
WTP = water treatment plant

Appendix H contains the details of these activities and details of the durations, including the bid packages.

# Section 7 Water Supply Alternatives Matrix and Ranking

To further refine the alternatives, Alta and PBAC participated in a workshop on February 17, 2022 to discuss and establish the water supply alternatives decision matrix. A summary of that meeting is provided in Appendix I. Using the 2017 report matrix as a starting point, the group decided to keep this matrix with some modifications described below.

## 7.1 Matrix

The previous water supply alternatives project documented in the 2017 report used eight criteria for comparing projects, intended to address the primary benefits and challenges associated with the water supply alternative projects considered. Each criterion has a scoring scale ranging from 0 to 3, with 3 being the most favorable score. Each criterion had weights assigned ranging between 0 and 10, with 10 being the most influential. This allowed some criteria to more strongly influence the selection and prioritization of projects. The scores were then multiplied by the weights to calculate a project priority score to develop a water supply alternative ranking.

Based on discussions during the February 2022 PBAC workshop, the 2017 matrix is carried forward in this project with two additional criteria (I and J) and slight weighting adjustments. Table 5 lists the screening criteria and weights. Only Criterion A is naturally a quantitative value; the remaining criteria take qualitative information and attempt to quantify it in order to be able to rank the alternative projects. Appendix J contains a description of the screening criteria and scale details, and also includes the 2017 weights for comparison.

**Table 5. Decision Matrix Screening Criteria and Weights**

| | Screening Criteria | Weights |
|---|---|---|
| A | Unit cost of supply (Capital cost and O&M) | 9 |
| B | Long-Term Supply Reliability | 10 |
| C | Technical Certainty of Success | 6 |
| D | Property Acquisition | 6 |
| E | Permitting Complexity – Water Rights | 6 |
| F | Permitting Complexity – Environmental | 6 |
| G | Extent of Regional Agreements Required | 4 |
| H | Public Acceptability | 8 |
| I | Surface Water Quality Impacts | 6 |
| J | Aquifer Water Quality Impacts | 6 |

Each alternative phase is scored in the matrix with the exception of the individual phases with conveyance to both Pullman and Moscow (Alternatives 1 and 2B). These are not scored individually because 1) the cost of the first phase is significantly higher than the second phase (impacting Criterion A), and 2) the scores for the other criteria are the same for both. For example, Alternative Phase 2B is scored, but not the individual Alternative Phases 2B1 and 2B2. Each alternative as a whole (ex. Alternative 1, 2, etc.) is then scored based on a weighted average of the individual alternative phase scores using the ratio of the estimated annual water supply for the alternative phase to the annual supply for the alternative as a whole.

Because the unit cost of supply criterion is based on the maximum cost of an alternative phase, there are two decision matrix results tables. Table 6 shows the decision matrix for Alternatives 1, 2, 3, and 4. Table 7 shows the decision matrix for Alternatives 1, 2, 3, and Modified 4.

## 7.2 Project Priority Scores and Ranking

Table 6 and Table 7 show the matrix decision project priority scores. These scores show the following alternative ranking for Alternatives 1, 2, 3, and 4, where Rank 1 is the highest rank (scores are shown in parentheses):

1. Alternative 3 (127)
2. Alternative 2 (122)
3. Alternative 1 (113)
4. Alternative 4 (93)

These scores show the following alternative ranking for Alternatives 1, 2, 3, and Modified 4, where Rank 1 is the highest rank (scores are shown in parentheses):

1. Modified Alternative 4 (144)
2. Alternative 3 (118)
3. Alternative 2 (115)
4. Alternative 1 (99)

The highest-ranking alternative is Modified Alternative 4, followed by Alternative 3.

## 7.3 Matrix Sensitivity

Matrix sensitivity is a means to evaluate the decision matrix outcomes and alternative ranking. To evaluate the sensitivity, each criterion is given a weight of 1) half the existing weight and then 2) zero, and the matrix is rescored. The resulting scores, and thus ranking, shows that only when the Surface Water Quality Impacts criterion has a weight of zero does a change in the alternative ranking occur, and is thus the most sensitive criterion. In this instance, Alternative 2 scores and ranks higher than Alternative 3. This analysis is not to say that modifying the weights of additional criteria wouldn't change the scores/ranking. However, the criteria and weights assigned are based on consensus with PBAC and the sensitivity analysis can provide additional confidence in the alternative ranking.

## 7.4 Uncertainty

There is inherent uncertainty with the costs, schedule, water yield, and implementability of the alternatives examined in this study. The main objective of this study is to provide a comparative analysis of the four alternatives plus the modified alternative, and the uncertainty does not bias the comparison.

The 2017 report includes modeled uncertainty and risk, cost and schedule uncertainty, and yield uncertainty. Regarding uncertainty of the alternative scoring, one of the nine criteria has quantitative data (cost per AF), which has a percent of uncertainty added to the cost. The other eight criteria are based on attempting to quantify qualitative information, which also carries some degree uncertainty.

**Table 6. PBAC Water Supply Alternatives Decision Matrix**

| Alternative # | Phase # (Matching Phase #) | Project Type | Project Title | Project Description | Screening Criteria | | | | | | | | | | Total Score (Sum of Score x Weight) | Updated Rank for each Interim Step | Updated Rank by Alternative |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A. Unit Cost of Supply (based on $/AF) | B. Long-Term Supply Reliability | C. Technical Certainty of Success | D. Property Acquisition | E. Permitting Complexity – Water Rights | F. Permitting Complexity – Environmental | G. Extent of Regional Agreements Required | H. Public Acceptability | I. Surface Water Quality Impacts | J. Aquifer Water Quality Impacts | | | |
| | | | | | Weight (1-10): | | | | | | | | | | | | |
| | | | | | 9 | 10 | 6 | 6 | 6 | 6 | 4 | 8 | 6 | 6 | | | |
| 1 | | Surface Water Alternative | Snake River (Pipeline to Pullman and Moscow) Direct Use | Direct diversion from Snake River; Surface water pumped and conveyed to treatment; Treated surface water delivered to Pullman and Moscow potable water system | 1.56 | 3 | 3 | 1.5 | 1 | 0 | 1 | 1 | 1 | 3 | 113 | 7 | 3 |
| | 1A<br>1B | | WTP, Pipeline to Pullman<br>WTP expansion, Pipeline to Moscow | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | 2A | Aquifer Recharge | Moscow: Paradise Creek and/or South Fork Palouse River AR | AR with in-city surface water diversion; Treatment; Active injection of treated water in Moscow AR wells during spring runoff | 1.88 | 1.5 | 2 | 1.5 | 2 | 0 | 3 | 1 | 3 | 1 | 109.0 | 8 | |
| | 2B | Surface Water Alternative | Pullman & Moscow: North Fork Palouse River Direct Use | Direct diversion from NF Palouse River in WA; Surface water pumped and conveyed to treatment north of Pullman; Treated water conveyed to both City of Pullman and City of Moscow potable water systems | 2.37 | 1.5 | 3 | 1.5 | 2 | 1 | 1 | 2 | 1 | 3 | 125.3 | 4 | |
| | 2B1<br>2B2 | | WTP, Pipeline to Pullman<br>WTP expansion, Pipeline to Moscow | | | | | | | | | | | | | | |
| 2 | | Total | | | 2.28 | 1.5 | 2.8 | 1.5 | 2.0 | 0.8 | 1.4 | 1.8 | 1.4 | 2.6 | 122 | | 2 |
| | | | | | | | | | | | | | | | | | |
| | 3A | Surface Water Alternative | Pullman: SF Palouse River Direct Use | Direct Diversion Using Winter/Spring Runoff Direct Diversion from SF Palouse River; Treatment; Delivery to City of Pullman Water System during late winter and spring runoff | 2.44 | 1.5 | 3 | 1.5 | 2 | 1 | 3 | 2 | 1 | 3 | 134 | 3 | |
| | 3B | Surface Water Alternative | Moscow: Flannigan Creek/reservoir Direct Use | Flannigan Creek; Reservoir stored water pumped and conveyed to treatment; Treated water discharged directly to City of Moscow potable water system | 1.87 | 1.5 | 1 | 1.5 | 2 | 0 | 3 | 2 | 3 | 3 | 123 | 5 | |
| 3 | | Total | | | 2.09 | 1.5 | 1.8 | 1.5 | 2.0 | 0.4 | 3.0 | 2.0 | 2.2 | 3.0 | 127 | | 1 |

**Table 6. PBAC Water Supply Alternatives Decision Matrix**

| Alternative # | Phase # (Matching Phase #) | Project Type | Project Title | Project Description | Screening Criteria | | | | | | | | | | Total Score (Sum of Score x Weight) | Updated Rank for each Interim Step | Updated Rank by Alternative |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A. Unit Cost of Supply (based on $/AF) | B. Long-Term Supply Reliability | C. Technical Certainty of Success | D. Property Acquisition | E. Permitting Complexity – Water Rights | F. Permitting Complexity – Environmental | G. Extent of Regional Agreements Required | H. Public Acceptability | I. Surface Water Quality Impacts | J. Aquifer Water Quality Impacts | | | |
| | | | | | Weight (1-10): | | | | | | | | | | | | |
| | | | | | 9 | 10 | 6 | 6 | 6 | 6 | 4 | 8 | 6 | 6 | | | |
| | 4A | ASR | Pullman: SF Palouse River ASR | ASR Using Winter/Spring Runoff Diversion from SF Palouse River; Treatment; Active injection of treated water during late winter and spring runoff | 1.88 | 1.5 | 2 | 1.5 | 2 | 0 | 3 | 1 | 1 | 1 | 97.0 | 10 | |
| | 4B | Aquifer Recharge | Moscow: Paradise Creek AR | Aquifer Recharge Using Winter/Spring Runoff Direct Diversion from Paradise Creek; Treatment; Active injection of treated water in Moscow Aquifer recharge wells | 1.88 | 1.5 | 2 | 1.5 | 2 | 0 | 3 | 1 | 3 | 1 | 109.0 | 9 | |
| | 4C | Water Reuse | Pullman/WSU: Waste Water Reuse Project | Water Reuse Project WWTP Upgrades, Class A reclaimed water supply pumped to new water reuse system for irrigation at reuse sites in Pullman | (0.00) | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 1 | 1 | 136 | 2 | |
| | 4D | Passive AR | Moscow Waste Water Infiltration | Water Reuse for Infiltration Class A recycled water from Moscow WWTP discharged to shallow infiltration area to enhance Wanapum aquifer groundwater storage | 2.86 | 3 | 1 | 1.5 | 3 | 1 | 3 | 0 | 1 | 1 | 118.8 | 6 | |
| | 4E | Conservation Measures | Moscow Conservation Measures | Sum of all conservation measures from the 2015 Moscow Conservation Plan | 2.70 | 3 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 186 | 1 | |
| | | Conservation Measures | Pullman Conservation Measures | Sum of all conservation measures from the 2014 Pullman Water System Plan | | | | | | | | | | | | | |
| | | Conservation Measures | WSU Conservation Measures | Sum of all conservation measures from the 2008 WSU Water System Plan | | | | | | | | | | | | | |
| | | Conservation Measures | | Other conservation (calculated so conservation = 609 MGY) | | | | | | | | | | | | | |
| 4 | | Total | | | 2.22 | 1.6 | 1.3 | 1.3 | 1.7 | 0.6 | 2.2 | 0.7 | 1.2 | 0.8 | 93 | | 4 |

## Table 6. PBAC Water Supply Alternatives Decision Matrix

| Alternative # | Phase # (Matching Phase #) | Project Type | Project Title | Project Description | Screening Criteria | | | | | | | | | | Total Score (Sum of Score x Weight) | Updated Rank for each Interim Step | Updated Rank by Alternative |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A. Unit Cost of Supply (based on $/AF) | B. Long-Term Supply Reliability | C. Technical Certainty of Success | D. Property Acquisition | E. Permitting Complexity – Water Rights | F. Permitting Complexity – Environmental | G. Extent of Regional Agreements Required | H. Public Acceptability | I. Surface Water Quality Impacts | J. Aquifer Water Quality Impacts | | | |
| | | | | | Weight (1-10): | | | | | | | | | | | | |
| | | | | | 9 | 10 | 6 | 6 | 6 | 6 | 4 | 8 | 6 | 6 | | | |

Notes:

Base table from Anchor QEA et al. (2017)

AF: acre-feet

ASR: aquifer storage and recovery

AR = aquifer recharge

MGY: million gallons per year

NF: north fork

SF: south fork

WSU: Washington State University

WWTP: wastewater treatment plant

WTP: water treatment plant

**Table 7. PBAC Water Supply Alternatives Decision Matrix**

| Anchor QEA Final Alt# | Alta/ Jacobs # | Anchor QEA 2017 ID Summary Table | Project Type | Project Title | Project Description | Screening Criteria | | | | | | | | | | Total Score (Sum of Score x Weight) | Updated Rank for each Interim Step | Updated Rank by Alternative |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | A. Unit Cost of Supply (based on $/AF) | B. Long-Term Supply Reliability | C. Technical Certainty of Success | D. Property Acquisition | E. Permitting Complexity – Water Rights | F. Permitting Complexity – Environmental | G. Extent of Regional Agreements Required | H. Public Acceptability | I. Surface Water Quality Impacts | J. Aquifer Water Quality Impacts | | | |
| | | | | | | Weight (1-10): | | | | | | | | | | | | |
| | | | | | | 9 | 10 | 6 | 6 | 6 | 6 | 4 | 8 | 6 | 6 | | | |
| 1 | | 11 | Surface Water Alternative | Snake River (Pipeline to Pullman and Moscow) Direct Use | Direct diversion from Snake River; Surface water pumped and conveyed to treatment; Treated surface water delivered to Pullman and Moscow potable water system | (0.00) | 3 | 3 | 1.5 | 1 | 0 | 1 | 1 | 1 | 3 | 99 | 7 | 4 |
| | 1A<br>1B | | | WTP, Pipeline to Pullman<br>WTP expansion, Pipeline to Moscow | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | 2A | 14 | Aquifer Recharge | Moscow: Paradise Creek and/or South Fork Palouse River AR | AR with in-city surface water diversion; Treatment; Active injection of treated water in Moscow AR wells during spring runoff | 0.68 | 1.5 | 2 | 1.5 | 2 | 0 | 3 | 1 | 3 | 1 | 98.1 | 8 | |
| | 2B | 8 | Surface Water Alternative | Pullman & Moscow: North Fork Palouse River Direct Use | Direct diversion from NF Palouse River in WA; Surface water pumped and conveyed to treatment north of Pullman; Treated water conveyed to both City of Pullman and City of Moscow potable water systems | 1.69 | 1.5 | 3 | 1.5 | 2 | 1 | 1 | 2 | 1 | 3 | 119.2 | 4 | |
| | 2B1<br>2B2 | | | WTP, Pipeline to Pullman<br>WTP expansion, Pipeline to Moscow | | | | | | | | | | | | | | |
| 2 | | | Total | | | 1.50 | 1.5 | 2.8 | 1.5 | 2.0 | 0.8 | 1.4 | 1.8 | 1.4 | 2.6 | 115 | | 3 |
| | | | | | | | | | | | | | | | | | | |
| | 3A | 16B | Surface Water Alternative | Pullman: SF Palouse River Direct Use | Direct Diversion Using Winter/Spring Runoff<br>Direct Diversion from SF Palouse River; Treatment; Delivery to City of Pullman Water System during late winter and spring runoff | 1.84 | 1.5 | 3 | 1.5 | 2 | 1 | 3 | 2 | 1 | 3 | 129 | 2 | |
| | 3B | 1 | Surface Water Alternative | Moscow: Flannigan Creek/reservoir Direct Use | Flannigan Creek; Reservoir stored water pumped and conveyed to treatment; Treated water discharged directly to City of Moscow potable water system | 0.66 | 1.5 | 1 | 1.5 | 2 | 0 | 3 | 2 | 3 | 3 | 112 | 6 | |
| 3 | | | Total | | | 1.11 | 1.5 | 1.8 | 1.5 | 2.0 | 0.4 | 3.0 | 2.0 | 2.2 | 3.0 | 118 | | 2 |

## Table 7. PBAC Water Supply Alternatives Decision Matrix

| Anchor QEA Final Alt# | Alta/ Jacobs # | Anchor QEA 2017 ID Summary Table | Project Type | Project Title | Project Description | Screening Criteria | | | | | | | | | | Total Score (Sum of Score x Weight) | Updated Rank for each Interim Step | Updated Rank by Alternative |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | A. Unit Cost of Supply (based on $/AF) | B. Long-Term Supply Reliability | C. Technical Certainty of Success | D. Property Acquisition | E. Permitting Complexity – Water Rights | F. Permitting Complexity – Environmental | G. Extent of Regional Agreements Required | H. Public Acceptability | I. Surface Water Quality Impacts | J. Aquifer Water Quality Impacts | | | |
| | | | | | | Weight (1-10): | | | | | | | | | | | | |
| | | | | | | 9 | 10 | 6 | 6 | 6 | 6 | 4 | 8 | 6 | 6 | | | |
| 3 | 3A | 16B | Surface Water Alternative | Pullman: SF Palouse River Direct Use | Direct Diversion Using Winter/Spring Runoff Direct Diversion from SF Palouse River; Treatment; Delivery to City of Pullman Water System during late winter and spring runoff | 1.84 | 1.5 | 3 | 1.5 | 2 | 1 | 3 | 2 | 1 | 3 | 129 | 2 | |
| 2 | 2A | 14 | Direct Use | Paradise Creek - Moscow | NEW - Direct Use | 0.68 | 0.0 | 3 | 1.5 | 3 | 0 | 3 | 2 | 3 | 3 | 115.1 | 5 | |
| 4 | 4E | 31 | Conservation Measures | Moscow Conservation Measures | Sum of all conservation measures from the 2015 Moscow Conservation Plan | 2.38 | 3 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 183 | 1 | |
| | | 32 | Conservation Measures | Pullman Conservation Measures | Sum of all conservation measures from the 2014 Pullman Water System Plan | | | | | | | | | | | | | |
| | | 33 | Conservation Measures | WSU Conservation Measures | Sum of all conservation measures from the 2008 WSU Water System Plan | | | | | | | | | | | | | |
| | | | Conservation Measures | | Other conservation (calculated so conservation = 609 MGY) | | | | | | | | | | | | | |
| Mod 4 (B) | | | Total | | | 1.79 | 1.70 | 2.35 | 1.99 | 2.52 | 1.46 | 3.00 | 2.33 | 2.04 | 3.00 | 144 | | 1 |

Notes:
Base table from Anchor QEA et al. (2017)
AF: acre-feet
ASR: aquifer storage and recovery
AR = aquifer recharge
MGY: million gallons per year
NF: north fork
SF: south fork
WSU: Washington State University
WTP: water treatment plant

# Section 8 Funding Strategy

A funding strategy must be developed commensurate with the selection of the final alternative. Funding and financing options to implement a supplemental water supply alternative and recommended steps to further refine a preliminary financing strategy are provided the *Financing Investigation Memorandum* (Appendix K), including details of the funding strategy development. Key elements of the memorandum include:

- Four-step financial planning process for significant capital investment projects, with emphasis on the first two steps of the process critical to advancing financial planning for the project: Step 1 - Prioritizing Goals and Step 2 - Identifying Strategies and Options
- Preliminary findings on funding and financing mechanisms

There are four general potential funding sources:

- Grants
- Municipal agency or special purpose district funds
- State level funding
- Federal funding

PBAC and the entities need to make three key decisions to further advance the financing strategy:

1. Identify and weigh goals/objectives of a financing plan.
2. Determine which of the four alternatives will be implemented.
3. Decide which entity or combination of entities will be responsible for the financing; PBAC is not authorized to issue bonds or incur debt.

# Section 9 Conclusions

The purpose of the water supply alternatives refinement project was to conduct outreach, refine the water supply alternative projects, and recommend the top one or two water supply alternatives. This was accomplished by conducting outreach, filling the water rights data gap, identifying fatal flaws related to water rights and fisheries, identifying interim steps, indexing costs to 2021 dollars, comparing the alternatives, and evaluating funding strategies. Conclusions from this effort are described below.

**Outreach:** The increased outreach efforts to the public providing education on the status of the aquifer and the water supply alternatives refinement project is raising awareness and interest. State and tribal agency engagement with this project is helping identify processes and concerns, and keeps them apprised of the project.

**Water rights**: The legal availability of water appears to be present with the alternatives based on the preliminary water rights investigations (Snake River was not included in the investigation). In addition, the alternatives would require new water rights because there are insufficient existing water rights available to purchase to fulfill the supply target.

**Fatal flaws**: The alternatives refinement investigation did not reveal any fatal flaws during the water rights investigation or in discussions with the various state and fisheries agencies, with the following items of note. Nez Perce tribal water rights claims in the Palouse Basin in Idaho, if approved, could potentially impact water availability for the projects with water from Idaho. State

fisheries agencies expressed concerns with the smaller water bodies having sufficient availability to meet both flows for aquatic needs and needs of the water supply alternative. The fisheries agencies will review this report and provide comments soliciting discussions for next steps.

**Interim steps**: Each alternative has interim steps that are either distinct projects that different communities could implement or linked projects that could be phased as the supply need and funding increases. Communities would share a water source in the linked projects. In addition, a new Modified Alternative 4 is introduced to replace Alternative 4. Modified 4 is more cost effective and incorporates feedback from the public in that it does not include ASR or AR.

**Current costs**: 2021 costs for Alternatives 1, 2, 3, and Modified 4 for the alternatives as a whole:

- Capital costs (rounded to the nearest million): $74 – 110 Million
- Annual O&M costs (rounded to the nearest hundred thousand): $1.6 – 6.0 Million
- Total Present Value Costs/AF (rounded to the nearest thousand): $27 – 67 Thousand

**Alternative comparison**:

Alternative 1 has the highest capital cost, O&M cost, and total present value $/AF of annual supply, and it also ranks the lowest in the 10-criteria decision matrix (i.e., the lowest score), which includes a cost criterion. However, this option had preliminary favor with the state fisheries agencies due to the volume of water in the river compared to the proposed withdrawal amounts. The national fisheries agencies agreed the amount of water proposed for diversion from the Snake River is considered rather minimal.

Modified Alternative 4 had the lowest capital cost, O&M cost, and total present value $/AF of annual supply, and it also ranks highest in the decision matrix. However, this option has the lowest reliability of water availability, and until instream flows are determined, it is unknown if there is sufficient physical availability of water as determined by the state fisheries agencies. Though in-stream flow mitigation is possible, it would require additional cost and likely extend the schedule of the project.

**Funding strategies**: A funding strategy needs to be developed. There are opportunities for funding the alternatives, and upon selection of an alternative and governance structure, a funding strategy can be developed. The strategy is likely to include a blend of funds and revenue that will need to consider the communities ability-to-pay, revenue sources, and external funding sources.

# Section 10 Recommendations

There is no single alternative that stands out appreciably. However, based on the ranking and feedback from the agencies, Alta recommends PBAC move forward to the next steps with Modified Alternative 4 (ranked first) and either Alternative 1 (ranked last) or Alternative 3 (ranked second). Alternatives 1 and 3 provide a larger water supply which offers an option if it is determined there is an insufficient water supply with the top-ranked alternative. Alternative 1 is preliminarily favored with fisheries agencies, yet Alternative 3 ranked second in the matrix and is expected to contain a large supply of water which may also find favor with the fisheries agencies. The alternative that will ultimately be implemented is more likely to depend on funding, site-specific issues such as water availability and property availability, and the preference of local governments.

The recommendation is to focus attention and resources on the selected one to two alternatives for further technical and non-technical refinement. Non-technical elements may include leadership and agency support, public input, and funding availability, etc. The other alternatives are still viable and may be considered, should findings from the refinement process indicate the need. In addition, new information like major project cost changes could result in a shift in focus. For example, if a local utility was to include a pumped storage option on the Snake River, Alternative 1 may have a significant cost reduction potentially making this alternative more favorable.

To evaluate the affordability of a water supply alternative for the communities, Alta recommends conducting a water utility rate study on the alternative(s) chosen to move forward. The results of the study may influence the alternative selection.

# Section 11 Near-Term Next Steps

The water supply alternatives are large projects, in both scale and cost. There are multiple steps that need to be taken and formal processes that must be followed before a project is selected and ready for implementation. This section focuses on the near-term next steps. These steps include dissemination of this report, developing consensus amongst PBAC members on an alternative(s) to focus attention and resources, developing a plan to further refine this alternative(s), and having discussions with community leaders, state and tribal agencies, and the public. Outcomes of the discussions reaching critical decision points which form the foundation of the project include:

- Obtaining consensus amongst the PBAC representative entities on which alternative(s) to move forward
- Obtaining consensus amongst the state agencies on which alternative(s) to move forward and determining the final authority over the project (i.e., who has the final say over which alternative moves forward)
- Determining a governance structure, utility, or Joint Powers arrangement to enable funding and regulatory negotiations and to determine responsibility for next steps with implementation
- Developing a funding strategy and evaluating how to equitably pay for the alternatives amongst the entities and their constituents
- Developing an implementation plan for the alternative that includes additional public engagement
- Creating a written agreement between the communities (ex. memorandum of understanding) for implementation of the preferred alternative
- If PBAC and the entities choose to move forward with Alternatives 1 or 2, seeking guidance from the states for how to legally move water from Washington into Idaho

Engagement is crucial for maintaining the momentum toward selection and implementation of a water supply alternative. PBAC will continue to spearhead the development of an alternative water supply project, and in keeping with their mission they will conduct education and outreach. The community can be certain they will have opportunities to provide feedback throughout the process.

Following the near-term next steps or somewhat in parallel, funding could be secured to conduct certain project preliminary work (ex. water utility rate study, water quality/quantity investigations,

pipeline route study, site selection). Development of longer-term planning steps (ex. project funding, water rights acquisition) will occur as the process progresses and after key decisions are made.

## Section 12 References

Anchor QEA, EA Engineering Science and Technology, Inc., and HDR, 2017. Palouse Groundwater Basin Water Supply Alternatives Analysis Report. March.

Anchor QEA, 2018a. Draft Memorandum to PBAC regarding Water Rights Review and Strategy Development. February.

Anchor QEA, 2018b. Memorandum to PBAC regarding Summary of March 27, 2018 Meetings with Washington State Department of Ecology and Idaho Department of Water Resources. April.

Anchor QEA, 2019a. Memorandum to Washington State Department of Fish and Wildlife regarding Palouse Groundwater Basin Water Supply Alternatives – Washington State Department of Fish and Wildlife Information Request. April.

Anchor QEA, 2019b. Memorandum to PBAC regarding Summary of August 22, 2019 Conference call with National Marine Fisheries Service. October.

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# Appendix A
# Outreach Plan for the Water Supply Alternatives

# PBAC Water Supply Alternatives Outreach Plan

## Final

Prepared for:
Palouse Basin Aquifer Committee

**February 17, 2021**

Prepared by:
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220 East Fifth Street, Suite 325
Moscow, Idaho 83843
**alta-se.com**

Alta
Science & Engineering, Inc.

## Contents

## Appendices



## Tables

## Acronyms and Abbreviations

| | |
|---|---|
| Alta | Alta Science & Engineering, Inc. |
| Ecology | Washington Department of Ecology |
| GWMP | Groundwater Management Plan |
| IDWR | Idaho Department of Water Resources |
| LEAP | Legislative, Executive, Administrative, and Political |
| PBAC | Palouse Basin Aquifer Committee |
| PBWS | Palouse Basin Water Summit |
| SEG | Stakeholder Engagement Group |

# Section 1 Introduction

The purpose of this document is to provide a guide for the Palouse Basin Aquifer Committee's (PBAC's) outreach activities. Objectives include identifying key stakeholders, leadership roles and responsibilities, and communication methods; developing a foundation of content for outreach presentations, general schedule, and feedback loop; and establishing metrics to ensure progress will be made. This outreach plan uses the *PBAC Communication Action Plan* (DH 2017) as its foundation.

Outreach is an important component of the water supply alternatives refinement. This is in alignment with PBAC's overarching organizational goals listed below (DH 2017):

1. Build community awareness and understanding of the Palouse Basin's groundwater supply.
2. Engage the community and build public support of and involvement in PBAC's mission to ensure a quality, long-term water supply.
3. Strengthen PBAC's reputation and credibility as the Palouse Basin Groundwater Authority.

The goals of outreach activities during the water supply alternatives refinement process are to inform, educate, solicit, incorporate feedback, and gain informed consent for a selected alternative(s). The outreach that is performed under this plan is intended to demonstrate that PBAC has done work to gain community support to meet expectations from potential funding sources. PBAC will attempt to reach as many stakeholders as possible; however, some communication efforts will be tailored to directly target certain audiences based on the available resources.

# Section 2 Stakeholders

Stakeholders are individuals or groups that have an interest in or may be affected by a water supply alternatives decision; therefore, PBAC will work towards engaging various stakeholders in the evaluation process. Everyone who resides within the basin boundaries is considered a stakeholder, but dividing stakeholders into subgroups will help PBAC to target their messaging and reach more people. The Legislative, Executive, Administrative, and Political (LEAP) Analysis (in progress) will provide a list of individuals and their contact information who should be included in the engagement process and includes those who requested involvement. In addition, groups within the categories listed below should be included in the outreach (*details will be developed after receipt of the LEAP Analysis report*).

- Non-profit
- Local and state political / governmental
- Economic, commercial, industrial
- Environmental
- Local University
- Rural

- Impacted citizens

### 2.1 Stakeholder Engagement Group

PBAC established a charter for a Stakeholder Engagement Group (SEG) in 2020 with hopes to launch the group in early 2021. The SEG will provide input to PBAC through dialogue among a broad range of interested parties focusing mainly on the four water supply alternatives and associated engineering and environmental evaluations and analyses, research activities, and public involvement efforts. Input from the SEG is expected to play a critical role in public engagement and will help guide outreach activities. The SEG member invitee list is expected to be finalized in January 2021. The SEG Charter provides additional details (see Appendix A). PBAC will incorporate SEG feedback into the alternative selection process.

The first SEG meeting is anticipated to occur in February 2021 after the SEG participant list is finalized. The first few meetings are anticipated to be monthly then shifting to quarterly.

## Section 3 Roles and Responsibilities

Effective leadership, teamwork, and communications are critical to the success of this outreach plan. The PBAC Executive Manager, Korey Woodley, will lead the outreach activities. Although multiple PBAC interests should be engaged, the June 2019 PBAC Workshop identified the importance of having a single point of contact in order to maintain messaging consistency, both electronically and in person. In addition to Korey, others have important responsibilities within the outreach activities.

Key personnel and their roles and responsibilities for the outreach activities are as follows:

- Korey Woodley (PBAC Executive Manager): Reviews the outreach plan, leads the SEG and outreach activities, develops content for the outreach tactics described in Section 4, develops schedules for the tactics under her leadership (see Section 4), conducts speaking engagements, staffs the PBAC booth at events, manages and updates PBAC's social media accounts, manages and updates the PBAC website, creates surveys and reviews and records results, documents outreach activities, and follows the outreach plan and outreach schedule.
- Paul Kimmell (Latah County / PBAC chair): Reviews the outreach plan; assists with outreach activity planning, content, and decisions; provides management guidance; schedules and ensures advertising tactics are completed on schedule; leads the podcast tactic; handles media relations; and is the SEG leader backup #1.
- Tyler Palmer (City of Moscow / PBAC member): Is the SEG leader backup #2.
- Communications Intern: Supports outreach and communications activities as delegated.
- Robin Nimmer and Alta Science & Engineering, Inc. (Alta) team: Completes the outreach plan, attends and provides assistance for SEG meetings, helps guide the SEG, assists with content for the tactics described in Section 4, works with Korey to develop the outreach schedule, ensures outreach progress is made, and documents outreach activities.

- PBAC Communications Subcommittee: Reviews the outreach plan, provides direction for outreach tactics and materials, provides guidance for the SEG and its direction, and provides support outreach activities as needed.

## Section 4 Tactics

The *PBAC Communication Action Plan* (DH 2017) presents PBAC's goals and communication tactics (Appendix B). PBAC's communications need to reach the widest variety of stakeholders using some or all of the following tactics (leader responsible in parentheses):

- Advertising (Paul Kimmell)
    - Ads in community publications: Daily News, Argonaut, Evergreen, and Home & Harvest. Content must be created. Fees are charged.
    - Press releases in community publications: Daily News, Argonaut, and Evergreen. Content must be created. No fees.
    - Articles in community publications: Daily News, Argonaut, Evergreen, and Home & Harvest. Ex. human interest story, quotes from Korey/SEG members. Content must be created. Fees unlikely.
    - Flyers in member entity newsletters: Pullman Community Update, City of Moscow Water Matters newsletter, Palouse Land Trust newsletter. Newsletters must be created, though could use one-page fact sheet (see next bullet). Fees are charged for printing costs for printed newsletters.
- Materials (Korey Woodley)
    - Brochures and one-page fact sheets: These should be available for distribution at in-person events and for meetings with state agencies. Other locations/venues may receive materials in the future as determined by the outreach leadership (Section 3). PBAC has a brochure and fact sheet about PBAC and the water supply alternatives. Fees may be charged for printing costs.
- Community Education Outreach (Korey Woodley)
    - E-newsletters: sent to interested parties who have provided their contact information. PBAC has an email list which is expected to grow throughout the outreach. The PBAC website also has a Contact Us link. Content for the e-newsletter must be created.
    - Events: County Fairs, Farmer's Markets, Lentil Festival. Korey Woodley or a PBAC designee will staff a PBAC booth at events to meet and talk with visitors and offer materials on PBAC and the water supply alternatives.
- Speaking engagements (Korey Woodley)
    - Stakeholder Groups: Korey Woodley or PBAC designee will give presentations. The LEAP analysis will help identify these groups. PBAC has a standard PowerPoint presentation that will be slightly tailored to each group.
    - College Classes: Korey Woodley or PBAC designee will give presentations. PBAC has a standard PowerPoint presentation that will be slightly tailored to the classes.

- Social Media (Korey Woodley)
    - May include Facebook, Instagram, Twitter, LinkedIn, or other. The Communications Intern is expected to assist in determining the most effective social media communication as well as the content and frequency of posts.
- Podcast (Paul Kimmell)
    - Needs further evaluation.
- Website (Korey Woodley)
    - PBAC website: All other tactics will direct people to the PBAC website for the most comprehensive and recently available information. The website will include links to related completed reports, showcase water supply alternatives work, up to date PBAC meeting agenda and notes, and information for the SEG meeting. This is a high priority tactic.
    - Links to PBAC's website on community websites
- One-on-one meetings (Korey Woodley, PBAC members, Alta)
- Other

The individual tactics used in the outreach program will be based on the resources available and approved by the PBAC Communication Subcommittee.

Due to the COVID-19 pandemic, PBAC will host virtual meetings/presentations until in-person meetings can safely be held.

# Section 5 Content

The content of the outreach tactics described in Section 4 will be based on the style of outreach conducted and available information and resources. All content should have clear and consistent messaging; PBAC will ensure consistency by reviewing presentation and outreach messaging points at retreats and PBAC meetings. PBAC will use their existing tactics content and provide updates when necessary to incorporate new information about the water supply alternatives as guided by those listed in Section 3. It may be time consuming and costly to generate new content into certain tactics (ex. materials). Therefore, all tactics will point to the PBAC website which must be adequately maintained.

The following sub-sections describe the content for speaking engagements.

## 5.1 Content for Speaking Engagements

Content for the outreach engagement activities will be tailored by the audience and familiarity of the Basin and alternatives from past outreach. PBAC will develop a general PowerPoint presentation for the first outreach session, and another for a follow-on presentation. These will be updated with new information after approval by PBAC.

Each outreach meeting should have an agenda, sign-in sheet, and meeting notes. Korey Woodley will be responsible for these unless she designates Alta for certain meetings. Korey Woodley and Alta will keep these records.

### 5.1.1 Outreach Session #1

For speaking engagements, the first outreach session should lay the foundation and may be video recorded for others to view upon request. It may include the following:

1. PBAC background
    a. When and why formed - History of water use in the basin, flowing artesian wells to water level decline, bistate aquifer, etc.
    b. Member entities, including ex-officio members Washington Department of Ecology (Ecology) and Idaho Department of Water Resources (IDWR)
    c. Mission
    d. Groundwater Management Plan (GWMP)
2. Brief basin hydrogeology
3. Problem with declining water levels - Deepening wells, insufficient water, state laws prohibiting mining of groundwater. What happens if we do nothing (Groundwater Management Area designation)?
4. Summary of water supply alternatives
5. Water supply alternatives matrix and preliminary ranking
6. University of Idaho 2019 survey results
7. Current project summary and progress made
8. Questions/answers/feedback solicitation – Listen to concerns, learn what is important to them and why.

### 5.1.2 Outreach Session Follow Up

Following the first outreach session, subsequent speaking engagements should provide updates and may include the following:

1. Brief summary of items #1-6 from the first outreach session
2. Current project updates since last meeting to include:
    a. PBAC-funded project updates as pertinent to the water supply alternatives
    b. Phased approach findings
    c. Funding updates
3. Questions/answers/feedback solicitation/address concerns and close the feedback loop. See Section 7 for additional information.

## Section 6 General Schedule

The outreach general schedule provided in Table 1 is a guideline for conducting outreach and soliciting feedback. These are goals yet they need to remain flexible based on the project schedule and resources (leadership capacity, time, funds, etc.). The LEAP Analysis Report will provide the desired level of contact format and frequency for the individuals/groups listed. A more detailed schedule will be developed after receipt of the report with input and guidance from the PBAC Communications Subcommittee.

**Table 1. General Outreach Schedule**

| Tactic | Approximate Frequency | | | | | |
|---|---|---|---|---|---|---|
| | Yearly | Semi-Annual | Quarterly | Semi-monthly | Monthly | Other |
| **Advertising:** | | | | | | |
| Ads (Daily News, University newspapers, Home & Harvest) | | X | | | | |
| Press releases (Daily News, University newspapers) | | X | | | | |
| Articles (Daily News, University newspapers, Home & Harvest) | | X | | | | |
| Community newsletters (Pullman Community Update, City of Moscow Water Matters, Palouse Land Trust) | | | X | | | |
| **Community Education Outreach:** | | | | | | |
| Farmer's Markets (Moscow, Pullman) | | | X | | | |
| Festivals (Lentil Festival) | X | | | | | |
| County Fairs (Latah and Whitman) | X | | | | | |
| PBAC e-mail newsletter | | | X | | | |
| **Speaking Engagements:** | | | | | | |
| Other Stakeholder Groups | | | | | | X |
| SEG | | | X | | X | |
| University classes | | X | | | | |
| **Social Media** | | | | | X | |
| **Podcast** | | | | | | X |
| **PBAC Website** | | | | | X | X |

Generally, for the speaking engagements, a minimum of two touch points is desirable: one during the early development of the alternative's refinement and one later in the development. Ads, press releases, and articles are expected to be on an alternating schedule.

## Section 7 Feedback Loop

A feedback loop is an important component of the outreach activities. This involves presenting information and then soliciting, receiving, discussing, and incorporating or addressing feedback.

One of the goals for outreach is to gain community support. To accomplish this we aim for consensus as described by The Primes (2021):

1. *"Process satisfaction: Each stakeholder believes that the decision-making process is explicit, rational, and fair."*
2. *"Personal treatment: Each stakeholder feels treated honorable, meaning they have had ample opportunity to be heard, to make their opinions known, and to consider the opinions of others."*
3. *"Outcome satisfaction: Each participant can live with the outcome. Notice the words, 'live with', as opposed to 'agree with'."*

Concerns must be acknowledged and addressed. This may occur in future contacts with the same individual/group or progress updates in the various outreach tactics. Alta will document the feedback and feedback loop in the final Outreach Report.

## Section 8 Metrics

Metrics for outreach include both quantitative and qualitative measures. Quantitative metrics may include the number of:

- Advertisements and frequency in community publications
- Presentations to stakeholder groups
- Attendees at presentations
- SEG meetings
- Updates, content, visits, and unique visitors to the PBAC website
- People on the contact list
- Search engine optimization rating
- E-newsletters
- Posts / responses on social media
- Followers, fans, friends on social media
- Palouse Basin Water Summit (PBWS) presentations and attendees
- Brochures or handouts distributed
- Conversations with individuals
- Other (ex. Fairs, Markets)

Qualitative metrics may include an increase in inquiries/website traffic after engagements or website updates.

The use and results of surveys are helpful metrics. Surveys can be used to help establish the baseline level of knowledge to guide future direction, preferred methods and frequency of communication to guide communication, and water supply alternative preferences and concerns to guide outreach and selection of the preferred alternative(s). PBAC is currently developing a survey for the SEG. They will develop and provide additional surveys for stakeholders throughout the outreach process. Surveys are expected to be relatively simple, straightforward, and will likely use SurveyMonkey® or a similar online platform through the PBAC website. Korey Woodley is responsible for the surveys.

## Section 9 Records

It is important to document the outreach activities to demonstrate PBAC's efforts toward educating, informing, and soliciting feedback on the water supply alternatives. Meeting agenda and notes will be prepared for each meeting. Korey Woodley and Alta will keep outreach activities and feedback documentation, with shared records kept on a Microsoft Teams site.

## Section 10 References

DH, 2017. Palouse Basin Aquifer Committee Communication Action Plan.

GovFriend, in progress. LEAP Analysis.

The Primes, 2021. Consensus. < Consensus (theprimes.com)> Accessed December 14, 2020.

# Appendix B
# Outreach Campaign Booklet: Conserve Stabilize Thrive

March - December 2021

# Conserve Stabilize Thrive

PBAC Outreach

PALOUSE BASIN AQUIFER committee

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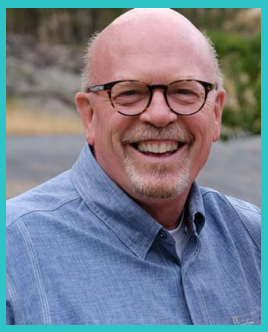
# Meet the Team

Conserve, Stabilize, Thrive

ASHLEY FORD

KOREY WOODLEY



PAUL KIMMEL

ROBIN NIMMER

# Introduction

The Palouse Basin Aquifer Committee, Alta, and the Stakeholder Engagement group are working together to ensure a long-term, quality water supply for the Palouse Basin region. The primary source of water for The Palouse is an underground aquifer with a limited amount of water. The population has been increasing meaning that we are using more water and creating a need to conserve and stabilize the aquifer. While conservation efforts have helped, we still need to find an alternative water source that is more sustainable for this growth.

The goals of outreach activities during the water supply alternatives refinement process are to inform, educate, solicit, incorporate feedback, and gain informed consent for a selected alternative(s). The outreach that is performed under this plan is intended to demonstrate that PBAC has done work to gain community support to meet expectations from potential funding sources. PBAC will attempt to reach as many stakeholders as possible; however, some communication efforts will be tailored to directly target certain audiences based on the available resources.

To accomplish our goals of educating the public and building a social media following I am suggesting a marketing campaign throughout 2021. This will help us promote conservation and bring awareness to the alternatives in a fun and eye-catching way to draw people to social media.

The marketing campaign is only for a dedicated period of time rather than overall marketing. Throughout this book, I will lay out a timeline and a guide for that timeline. This will include print materials such as stickers, bookmarks, and flyers as well as digital marketing tactics. We will use a slogan and campaign logo so that the campaign is uniform, these will also include the branding of the committee that already exists. We are not replacing existing branding, just adding to it only for the duration of the campaign.

The purpose of the campaign is to grow our social media presence and inform the public about PBAC and its efforts to solve the problem with water alternatives. Evaluation and analysis tools will be used to determine how successful the campaign was and help lay the groundwork for future PBAC activities.

# Creative Brief

**Concept:**
The guiding concept for this campaign is to promote conservation while also emphasizing the need to stabilize the aquifer. we can not conserve our way into sustainable water but conservation can not stop after an alternative is chosen and executed.

**Goals:**
**1.** Build community awareness and understanding of the Palouse Basin's groundwater supply.
**2.** Engage the community and build public support of and involvement in PBAC's mission to ensure a quality, long-term water supply.
**3.** Strengthen PBAC's reputation and credibility as the Palouse Basin Groundwater Authority.

**Objectives:**
Measurable objectives include social media analytics, earned media coverage, and engagement with social media, polls, and in a traditional setting such as the farmers market and presentations. The main objective is to build a presence in the community and online.

**Weekly & Monthly to do:**
**Weekly**: Make one week of posts for Twitter and Instagram to stay ahead by two weeks. Schedule posts through Canva's content planner and Twitter scheduled posts. Share relevant posts and news stories on Twitter. Make the weeks' worth of Instagram stories so they are ready to post daily. Post an extra post on the platform that is doing the best with a call to action to go follow on the other social media platforms. Do one poll a week on either Twitter or Instagram stories to boost engagement and gauge what our followers know. Weekly updates for analysis at the end of the campaign to ensure we are staying on track with the calendar.
**Monthly:** Update excels spreadsheets with earned and owned media. Set objectives for the upcoming month to ensure we are staying on track with the calendar. Update any presentations to stay current with analysis. Add any new content to the shared folder for feedback. Discuss the next steps of the campaign with PBAC, SEG, and ALTA.

# SWOT

*Paid Media vs. Earned Mediaa*

## "Stabilizing the aquifer is our goal but conservation is the key to thriving"

**S** Strong and abundant academic research and information out for the public.

**W** Social media is new so we don't have a strong following to call to action. Most things are too academic and hard for the general public to read.

**O** We have the opportunity to build our digital presence from the ground up, which actually gives us a lot of freedom.

**T** Our biggest threat is ourselves... we really need to be staying on top of everything to gain any momentum at all. Need to make the information more digestible.

# Poll Timeline

## JUNE 01-30

First Release- Release the poll and market it on social media, at events like farmers markets, and on bulletins around The Palouse

## JULY-OCTOBER

Initial Analysis- Analyze the data from the poll and create content that caters to the defined audience and their pre-existing knowledge

## NOVEMBER 01-30

Rerelease- rerelease the poll in November to use as a gauge of how well the outreach went

## DECEMBER

Final Analysis- Finally, use the data from the two polls to demonstrate the social media, engagement, and public knowledge growth

# Poll Marketing

The poll will be marketed both traditionally as well as digitally. We will attend farmers' markets, once early on for the first poll and once later on for the rerelease. At the farmers market, we will hand out stickers, bookmarks, and flyers to promote the poll. The flyers will also be put on bulletins around the Palouse. We will also be doing a press release to local media, and promoting it on social media platforms Twitter, Instagram, and Facebook at least 3 times a week. I am recommending we pay to boost one of those posts a week, the cost will be included in the budget.

## *Incentives*

We will be using a giveaway of an Avista gift card to encourage people to take the poll as well as follow us on social media to fulfill the goal of boosting engagement. People will be able to enter for the gift card a total of 4 times, once for following on each of the social media platforms and once for taking the poll. The winner will be chosen and announced by July 5th.

## *Rerelease*

The second poll, it will be sent out to the people who took the poll the first time as well as marketed in the previous ways. There will need to be an additional question asking if they took the poll during the initial release to note our audience growth from one release to another. The results of the first poll will give us an understanding of our audience and what they know so we can create content that is specific to them. The second poll will give us a scale to know how well outreach went.

# Demographic Questions

The goal of demographic questions is to define our target audience by seeing which demographics have which knowledge and their role in the community.

Occupation:
Gender
Male
Female
Other
Prefer not to answer.

Age
Under 18
18-23
24-30
31-39
Over 40
Prefer not to answer.

Location
Latah county
Whitman county
Other: where?
Prefer not to answer.

Education
High School
College
Graduate degree
Other: Explain
Prefer not to answer

Employment
Student
Part-time
Full-time
Unemployed
Other: Explain
Prefer not to answer

Family and Dependents: check all that apply.
Single
Pets
Married
Kids
Other: Explain

Where did you hear about this survey? check all that apply.
Farmer's market
Bulletin board
Social media
Other: Explain

# PBAC Questions

The goal of this set of questions is to understand the knowledge about the basin that our target audience has. This will help us build content for the future.

Did you know water levels in the lower aquifer are declining?
Yes
No

How long have water levels in the lower aquifer been declining?
120 years
20 years
4 years

Where does the Palouse get our water?
The Salmon River
Lake Coeur d'Alene
The Palouse Basin Aquifer
None of the above

What is wrong with where we get our water?
The Aquifer is not unlimited
We have no way of measuring it.
Increased population, increased water use
All of the above

Who uses the aquifer?
Latah county
Whitman county
The Palouse
All of the above

# PBAC Questions

What is the aquifer?
A water tower
That movie about the mermaid with blue hair
An underground basin of water

Have you received any water conservation devices from the city?
Yes
No

What is a conservation device?
Do you know that we are looking for alternatives for more sustainable water?
Yes
No

What are the alternatives?
Do you think your use would be considered average, below average, or above average?
Above average
Average
Below average

Do you try to conserve as much water as possible?
Yes
No
Should I?
Where do I start?

# Alternatives Questions

## The goal of these questions are to measure the publics opinions and support

Did you know entities in the basin are investigating an alternative water supply to 1) ways to stabilize the water level in the lower aquifer, 2) find a supplemental water source, and 3) advocate for less per capita use (i.e., conservation)?
Yes
No

How involved have you or your organization been in the PBAC/Aquifer solutions process?
None
Some
A lot
Individual or organization?

Would you like to be more involved?
Yes
No

Are you interested in participating in a PBAC Stakeholder Engagement Group?
Yes
No
I am on SEG

How important is it for the region to pursue actions to stabilize the aquifers?
Stabilizing the aquifer is the most important thing on the Palouse.
It is very important, but we should be actively pursuing conservation as well.
Once we find a sustainable water source, we will not have to worry about conservation.
Conservation does not matter, we can't conserve our way out.

# Open Response Questions

The goal of these questions is to allow people to freely voice any concerns or opinions.

The depletion of the aquifer affects everyone on the Palouse, how does it affect you?

What else should be considered during the pursuit to stabilize the aquifers?

Conservation is key, in what ways do you conserve water?

Do you have any questions, comments, or concerns?

# Outreach Plan

**Key messages:** Conservation is key but we can't conserve our way out but we can never stop conserving

**Defined audience:** Community members of the Palouse (Whitman and Latah counties), SEG, Businesses, the universities, and the towns. Primarily homeowners or renters.

**Tactics:**

**Advertising (Paul Kimmell)**

- o Ads in community publications: Daily News, Argonaut, Evergreen, and Home & Harvest. Content must be created. Fees are charged.
- o Press releases in community publications: Daily News, Argonaut, and Evergreen. Content must be created. No fees.
- o Articles in community publications: Daily News, Argonaut, Evergreen, and Home & Harvest. Ex. human interest story, quotes from Korey/SEG members. Content must be created. Fees are unlikely.
- o Flyers in member entity newsletters: Pullman Community Update, City of Moscow Water Matters newsletter, Palouse Land Trust newsletter. Newsletters must be created, though could use a one-page fact sheet (see next bullet). Fees are charged for printing costs for printed newsletters.

**Materials (Korey Woodley)**

- o Brochures and one-page fact sheets: These should be available for distribution at in-person events and meetings with state agencies. Other locations/venues may receive materials in the future as determined by the outreach leadership (Section 3). PBAC has a brochure and fact sheet about PBAC and the water supply alternatives. Fees may be charged for printing costs.

**Community Education Outreach (Korey Woodley)**

- o E-newsletters sent to interested parties who have provided their contact information. PBAC has an email list that is expected to grow throughout the outreach. The PBAC website also has a Contact Us link. Content for the e-newsletter must be created.
- o Events: County Fairs, Farmer's Markets, Lentil Festival. Korey Woodley or a PBAC designee will staff a PBAC booth at events to meet and talk with visitors and offer materials on PBAC and the water supply alternatives.

**Speaking engagements (Korey Woodley)**

- o Stakeholder Groups: Korey Woodley or PBAC designee will give presentations. The LEAP analysis will help identify these groups. PBAC has a standard PowerPoint presentation that will be slightly tailored to each group.
- o College Classes: Korey Woodley or PBAC designee will give presentations.PBAC has a standard PowerPoint presentation that will be slightly tailored to the classes.

# Outreach Plan

**Social Media (Korey Woodley)**
- o May include Facebook, Instagram, Twitter, Linked In, or others. The Communications Intern is expected to assist in determining the most effective social media communication as well as the content and frequency of posts.

**Podcast (Paul Kimmell)**
- o Needs further evaluation.

**Website (Korey Woodley)**
- o PBAC website: All other tactics will direct people to the PBAC website for the most comprehensive and recently available information. The website will include links to related completed reports, showcase water supply alternatives work, up-to-date PBAC meeting agenda and notes, and information for the SEG meeting. This is a high-priority tactic.
- o Links to PBAC's website on community websites

**One-on-one meetings (Korey Woodley, PBAC members, Alta)**

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Due to the COVID-19 pandemic, PBAC will host virtual meetings/presentations until in-person meetings can safely be held.

# Stakeholder Engagement Group

SEG: Stakeholders are individuals or groups that have an interest in or may be affected by a water supply alternatives decision; therefore, PBAC will work towards engaging various stakeholders in the evaluation process. Everyone who resides within the basin boundaries is considered a stakeholder, but dividing stakeholders into subgroups will help PBAC to target their messaging and reach more people. The Legislative, Executive, Administrative, and Political (LEAP) Analysis (in progress) will provide a list of individuals and their contact information who should be included in the engagement process and includes those who requested involvement. In addition, groups within the categories listed below should be included in the outreach (details will be developed after receipt of the LEAP Analysis report).

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- Local University
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The first SEG meeting is anticipated to occur in February 2021 after the SEG participant list is finalized. The first few meetings are anticipated to be monthly then shifting to quarterly.

# Brand Kit

*Essentials to creating a uniform presence on social media and in traditional marketing materials.*

## Colors

## Logos

PALOUSE BASIN
AQUIFER
committee

PALOUSE BASIN
AQUIFER
committee

## Hashtags

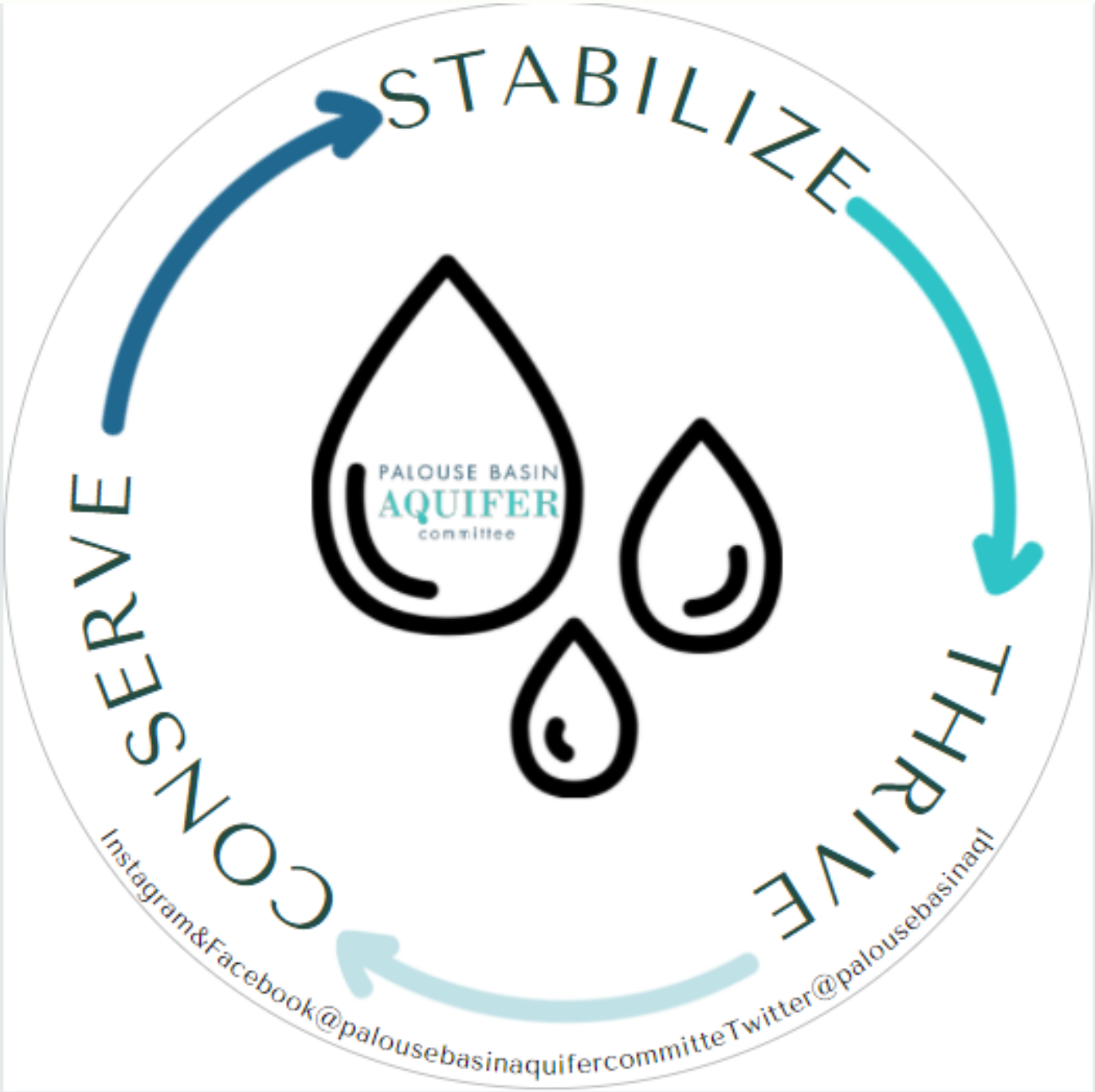
#idaho #washington #water #ypalouse #whitmancounty #latahcounty #moscow #pullman #wsu #uidaho

# Marketing Materials

*Flyer*

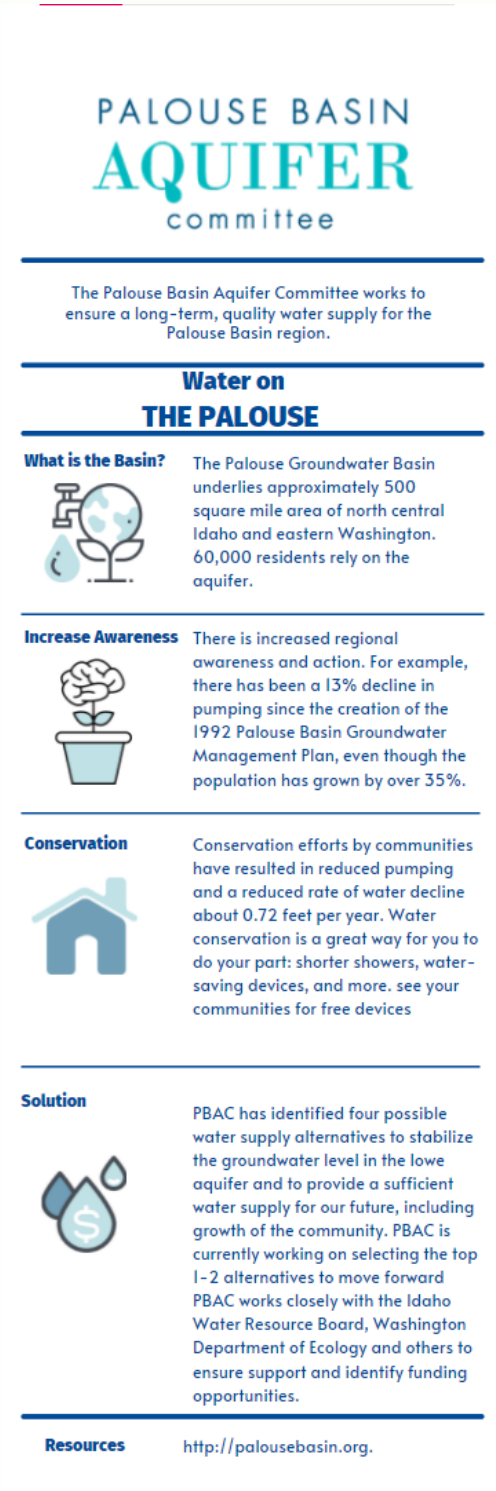
# Marketing Materials

*Sticker*



# Marketing Materials

*Bookmark*

# Social Media

*Schedule & Guidlines*

| MONDAY | TUESDAY | WEDNESDAY | THURSDAY |
|---|---|---|---|
| Twitter Post- Engagement post. Polls, Events, Call to action<br>BETWEEN 12PM AND 2PM<br>Instagram Story-fun fact or Conservation tip<br>*BEFORE 10 AM* | Instagram Post-PBAC/ Alternative related photo<br>BETWEEN 12PM AND 2 PM<br>Instagram Story-fun fact or Conservation tip<br>*BEFORE 10 AM* | Twitter Post- Shared post<br>BETWEEN 12PM AND 2PM<br>Instagram Story-fun fact or Conservation tip<br>*BEFORE 10 AM* | Instagram Post- People of PBAC<br>BETWEEN 12PM AND 2 PM<br>Instagram Story-fun fact or Conservation tip<br>*BEFORE 10 AM* |

| FRIDAY | SATURDAY | SUNDAY | NOTES: |
|---|---|---|---|
| Twitter Post- Fun Fact<br>BETWEEN 12PM AND 2PM<br>Instagram Story-fun fact or Conservation tip<br>*BEFORE 10 AM* | Instagram Post- Palouse Feature: Bussiness, Stakeholders or Fun Fact<br>*8 AM OR 5PM*<br>Instagram Story-fun fact or Conservation tip<br>*BEFORE 10 AM* | NONE | Connect Twitter and Instagram to Facebook to post the same posts automatically<br>Feel free to share any relevant posts or information on Twitter or stories |

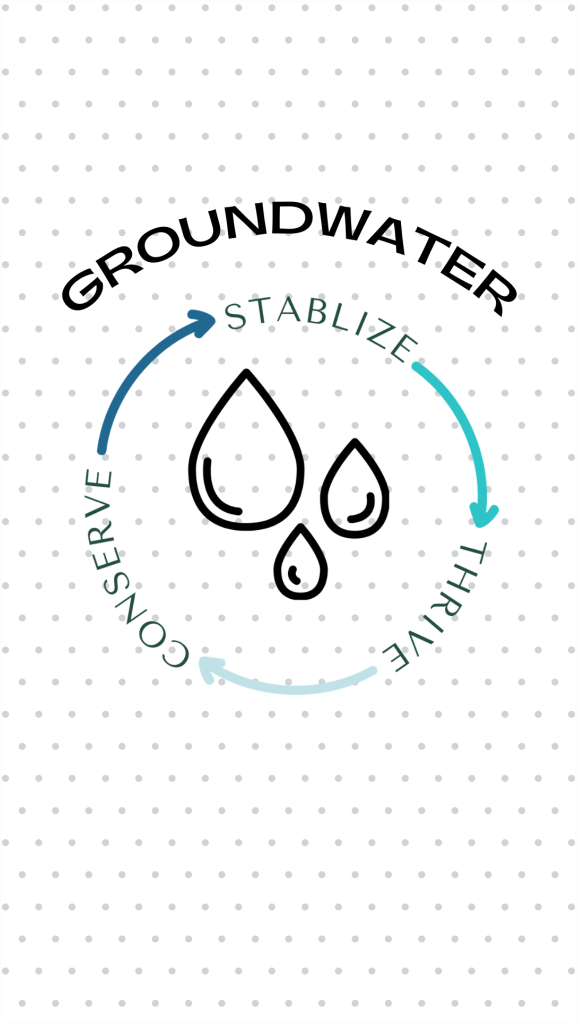
This content calendar lays out a basic idea for what should be posted every day on social media but can be adjusted to add important updates and time-sensitive posts. Included are some sample posts you could use as posts as well as ideas for future posts. Along with this book, there will be a Canva login which can be transferred to work with a team. All posts were created using Canva Pro, a monthly subscription included in the budget. All posts must follow the Brand Kit provided to create uniformity across platforms.

Guides social media even after the campaign. Keeping up with social media is a big job which is why it is important that we stay up to date by always having 2 weeks of content and scheduling that content to avoid missing a day. Consistency is key when building a platform. My personal social media goal is 500 followers combined. Instagram and Twitter were created on March 22nd of 2021 so all analytics are based from zero starting on that date to the end of the campaign.

# Instagram Stories

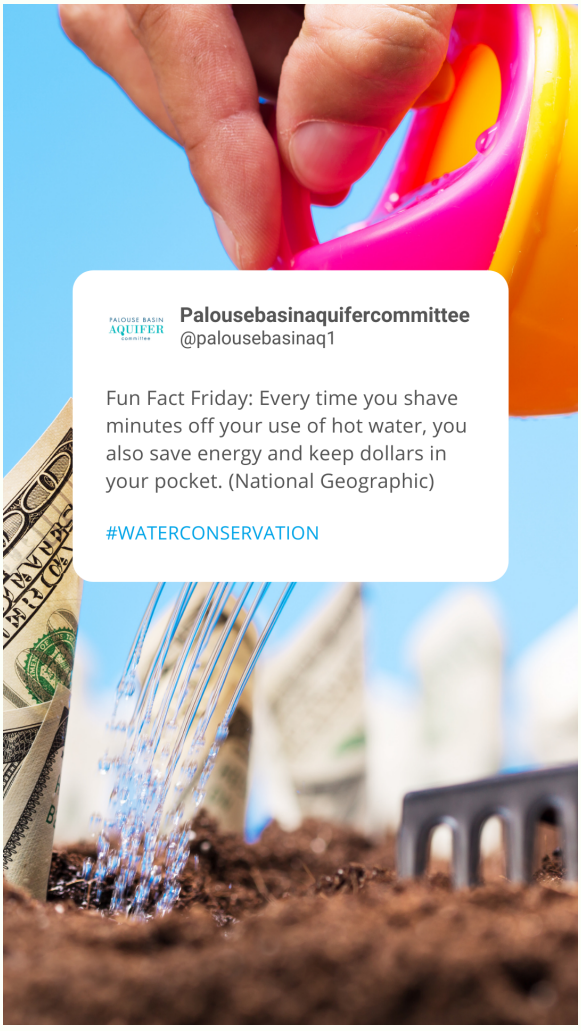
*Ready to Use Posts- Digital copy on Canva*

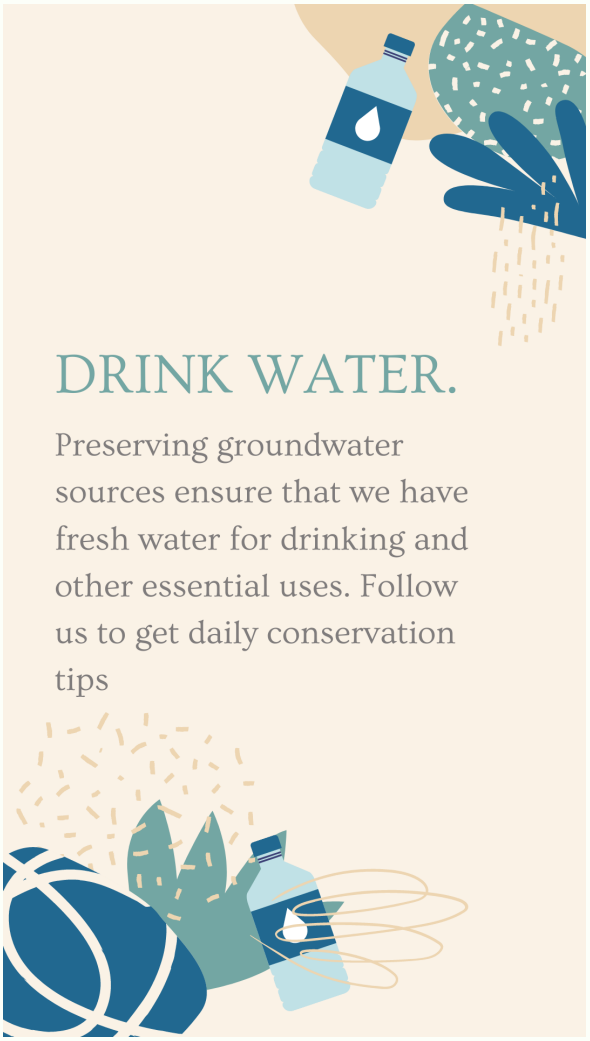
Daily posts, None on Sunday- these are examples to use of fun facts, conservation tips as well as updates. Note: these posts should be fun!

# Instagram Stories

*Ready to Use Posts- Digital copy on Canva*

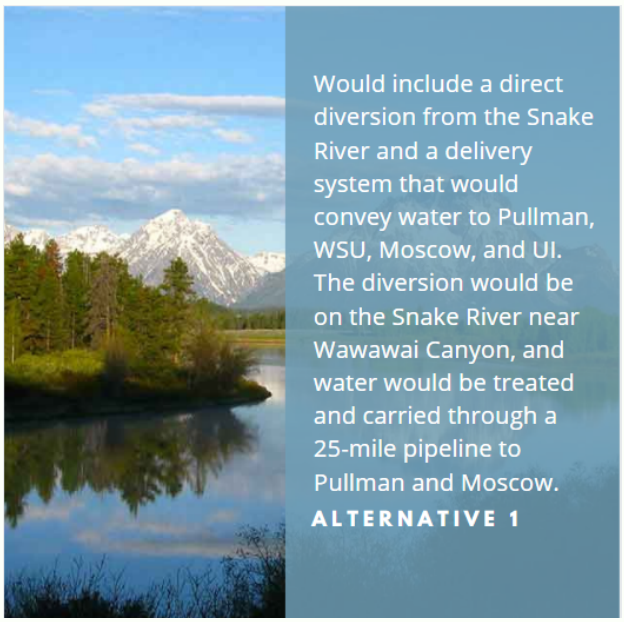


# Instagram

*Ready to Use Posts- Digital copy on Canva*

Tuesday: PBAC related post-information, meetings, facts. Type description when scheduling. Use hashtags provided in the Brand Kit



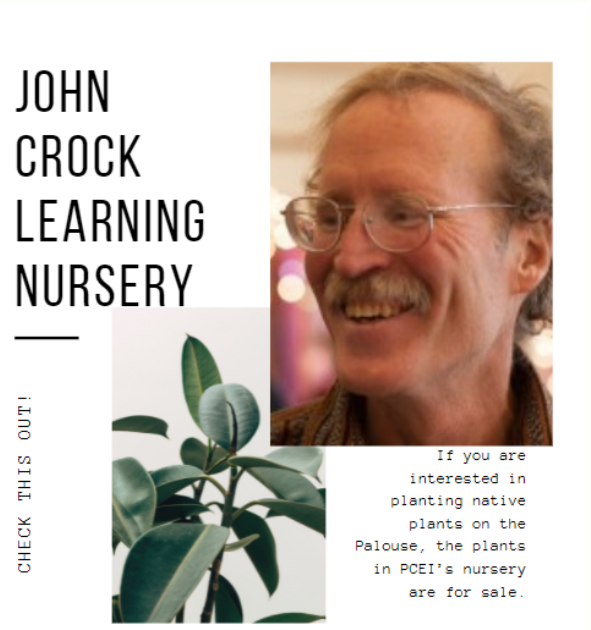

# Instagram

*Ready to Use Posts- Digital copy on Canva*

Thursday: People of the Palouse (PBAC, SEG, Speakers)- General outlines to be filled in later, feel free to use templates of previous people feature posts.


# Instagram

*Ready to Use Posts- Digital copy on Canva*
Saturday- Facts or Palouse features

# Twitter

*Ready to use posts*

Monday:

Come see us at the Moscow/Pullman Farmers Market this Saturday from 8am-1pm to get a sticker and learn how to enter a raffle for a gift card!

Poll: Did you come see us at the farmers market last week ? (Y/N)

Wednesday:

-Shared post-
These need to be found weekly through the news, related pages on twitter, community newsletters or general press releases.

Friday:

Fun Fact Friday: If you still have a standard toilet, which uses close to 3.5 gallons a flush, you can save by retrofitting or filling your tank with something that will displace some of that water, such as a brick (national geographic).

Fun Fact Friday: As much as 50 percent of the water we use outdoors is lost due to wind, evaporation, and runoff caused by inefficient irrigation methods and systems. A household with an automatic landscape irrigation system that isn't properly maintained and operated can waste up to 25,000 gallons of water annually(epa.gov).

Where to get water facts: National Geographic, EPA, PBAC Website

# Campaign Timeline

*General Outline until we solidify details of polls, marketing and more.*

1. June-July: Market the poll and social media to gain a strong sense of what content to create, draw people to social media to inform them further.
2. July-October: presentations, Farmer's market, and social media to push conservation and inform the public of alternatives.
   October: Market Rerelease of the poll
3. November- December: Second poll to gain a final piece of insight before analysis
4. December: Analysis and report to gauge how well the plan went and what happens next.

# Budget

| | |
|---|---|
| Campaign estimated budget: | ??? |
| Social Media | $100 |
| Print Materials | $180.50 |
| Content management site: Canva | $130/year |
| **Total** | $410.50 |

*-These numbers will change this week when I get a call back from the printers-*

Boosting social media posts by month for Twitter, Instagram, and Facebook will push our content to more people to achieve the goal of growing a social media presence. Canva Pro: Create content with a team and set branding also has a content calendar. Print Materials: Sticker, bookmark, flyers.

# Analysis

*These are place holder pages because this will get filled in as we complete marketing and polls.*

Evaluating external social media influence using analytical tools will result in tangible data.

*-Fill this out at the end of the campaign-*

| | |
|---|---|
| **Social media** | Excel and charts |
| **Earned media** | Excel and charts |
| **Poll 1** | Answers and charts for percentages |
| **Poll 2** | Compare with poll 1, answers, charts, and comparison paragraph |
| **Conclusion** | Recap campaign and final thoughts |

# Thank You

PALOUSE BASIN
AQUIFER
committee

# Appendix C
# PBAC Awareness Poll Findings

DECECEMBER 2021

# PBAC AWARENESS POLL FINDINGS

PALOUSE BASIN AQUIFER COMMITTEE COMMUNITY OUTREACH AND ENGAGEMENT EFFORTS

"THANK YOU FOR DOING THIS WORK. I THINK WE ALL TAKE CLEAN WATER FOR GRANTED!"

PALOUSE BASIN AQUIFER committee

01

# GOALS

**CONSERVE, STABILIZE, THRIVE**

> *Gain community engagement and traction on social media through the "conserve, stabilize, thrive" campaign*

Timeline: The poll started September 8th, 2021, and ended October 8th, 2021.

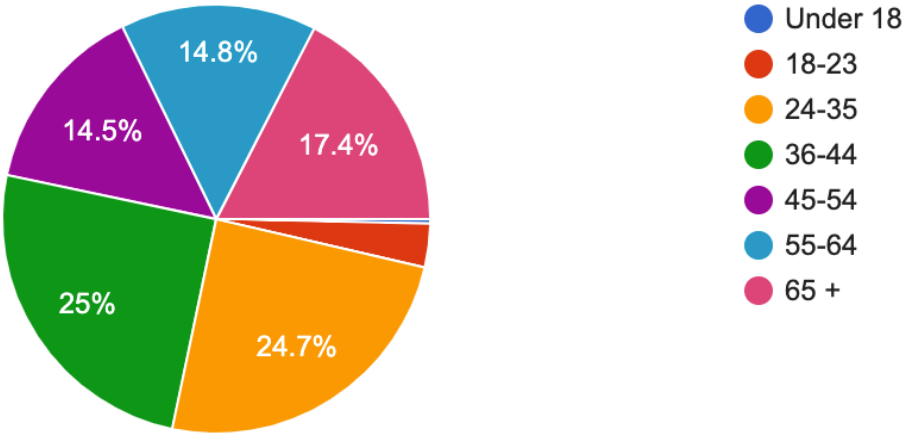
Goals: The primary goals for this poll were to gain an understanding of public knowledge of the aquifer; begin to provide information about PBAC; and drive people to our social media. These goals will allow us to make targeted content on social media and increase community engagement for analysis and awareness.

Findings: The poll was produced and distributed through Google Poll. We had a total of 306 responses.

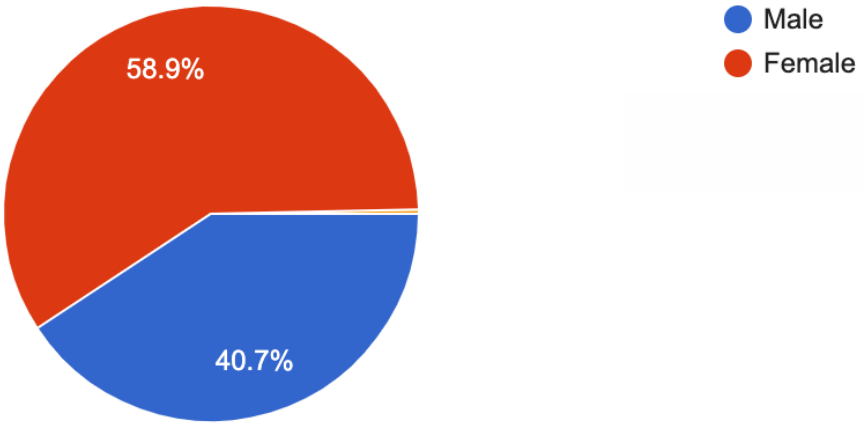
# 02

## AGE

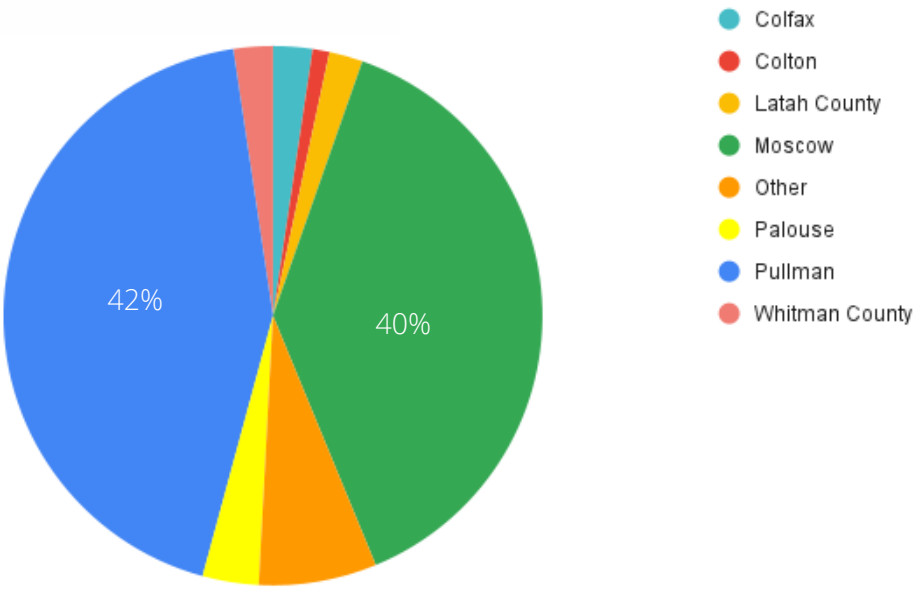
**The first five questions of the poll were demographic questions to help us better understand our audience**




## GENDER



# 03




*"It concerns me that residents are being asked to conserve but the city is still approving large housing projects to continue."*

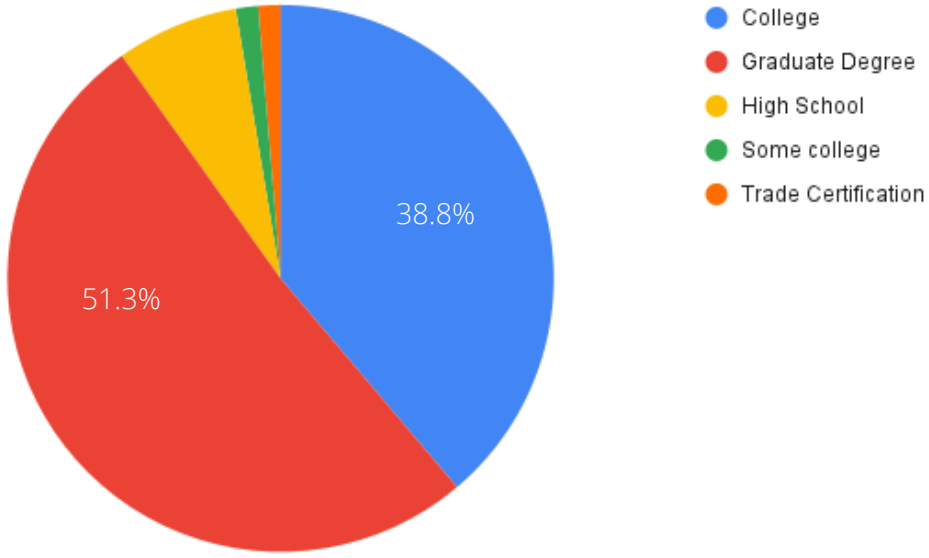
## PLACE OF RESIDENCE

The majority of poll respondents live in Moscow, Pullman, Troy, and Colfax. There were several people in the smaller towns that took the poll as well. This shows that we are able to gain engagement from a large area and that people all around the Palouse care about PBAC.

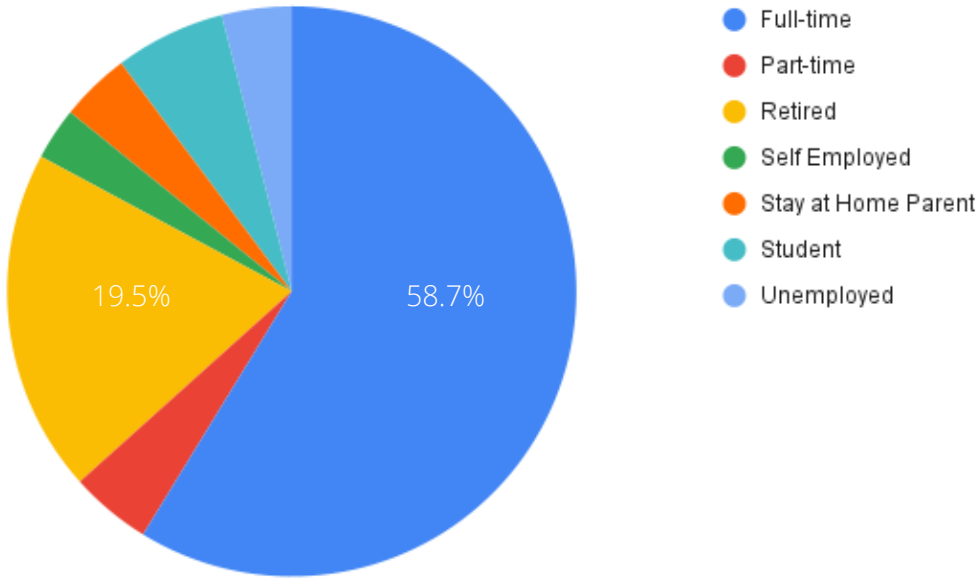
Even if all of these communities don't use water from the basin , it is good to create broad awareness.

# 04

## EDUCATION




## EMPLOYMENT



05

# PBAC/AQUIFER QUESTIONS

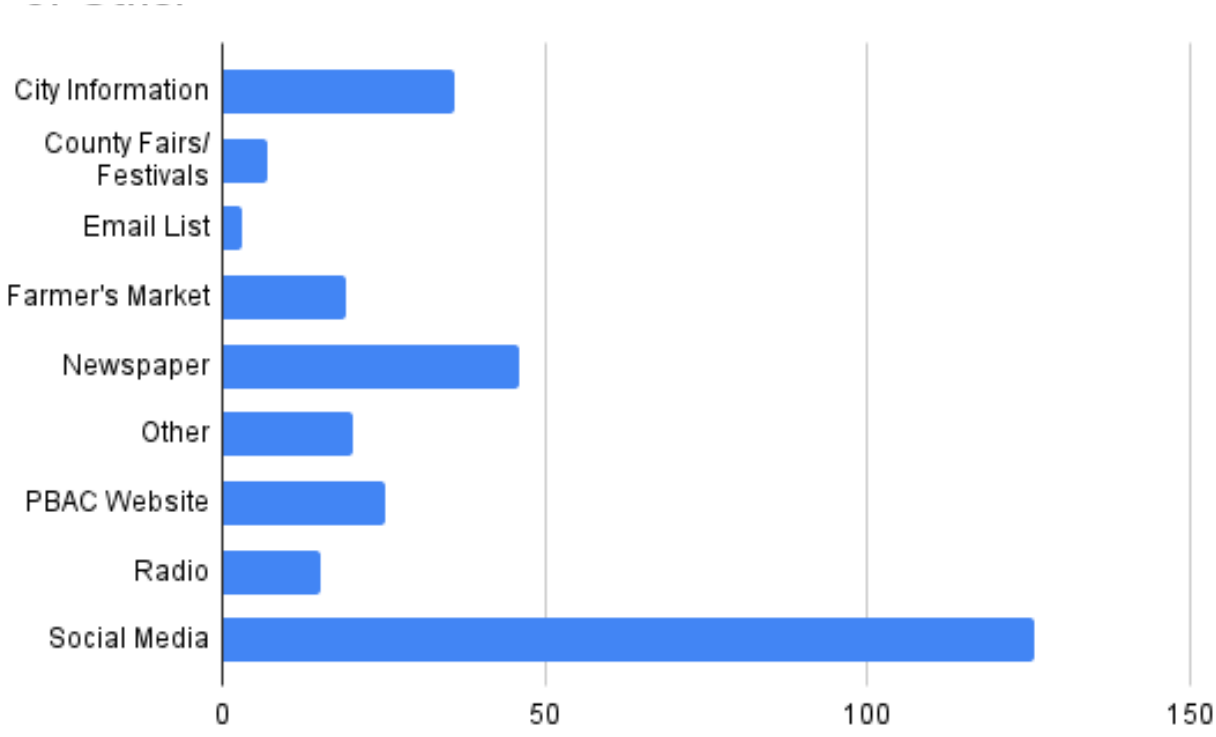
## EXPECTATIONS

The goal of this section was to understand the level of awareness of the basin. This will help us build social media and marketing content in the future. We also used these questions to provide a little bit of PBAC education.

07

# WHERE DO YOU GET PBAC UPDATES?

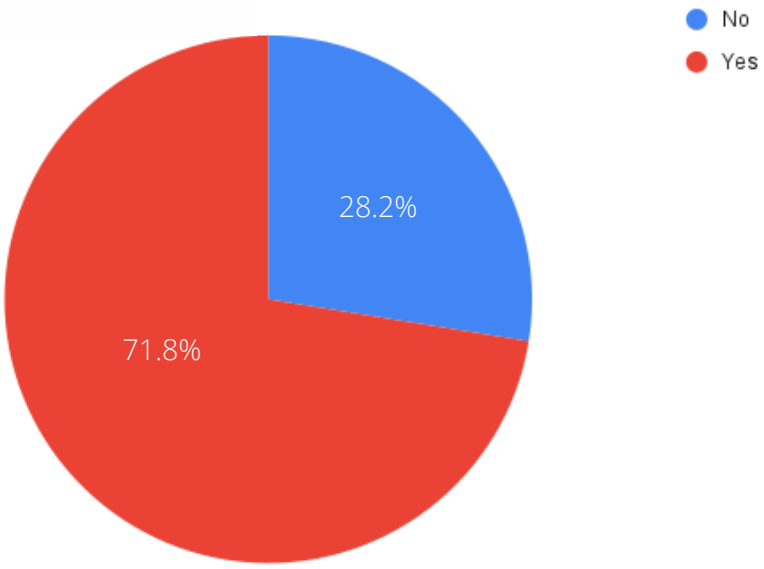
**People are getting their information, primarily, from us through traditional marketing but also our digital marketing.**




**"I would like to get a pamphlet in my mailbox about all of this and how to be a water-efficient consumer."**

06

# HAVE YOU HEARD OF PBAC?

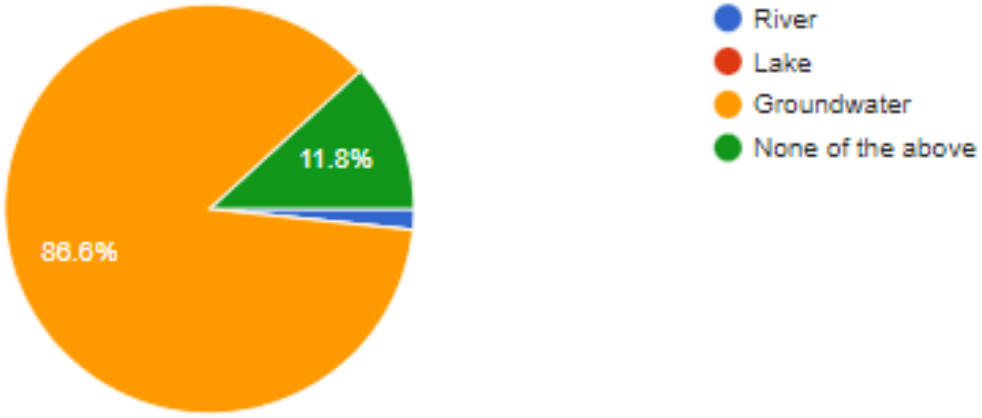



The Palouse Basin Aquifer Committee (PBAC) was established in 1967 “To ensure a long-term quality water supply for the Palouse Basin region”. Ways in which we are fulfilling our mission include: community outreach, research, groundwater monitoring, Future water resource planning. Have you heard about PBAC?

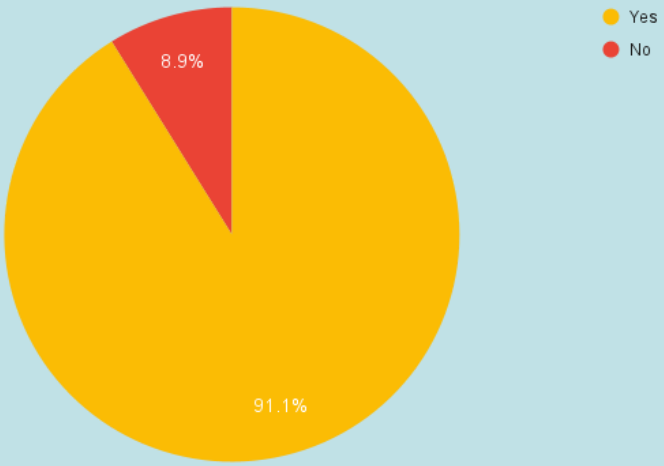
Finding: We now have the insight that people know about PBAC and are interested. Using this insight we can create more educational content about conservation and what PBAC does.

# 08

## WHERE DO THE PALOUSE ENTITIES (E.G., MOSCOW, PULLMAN, UI, WSU) GET THEIR WATER?

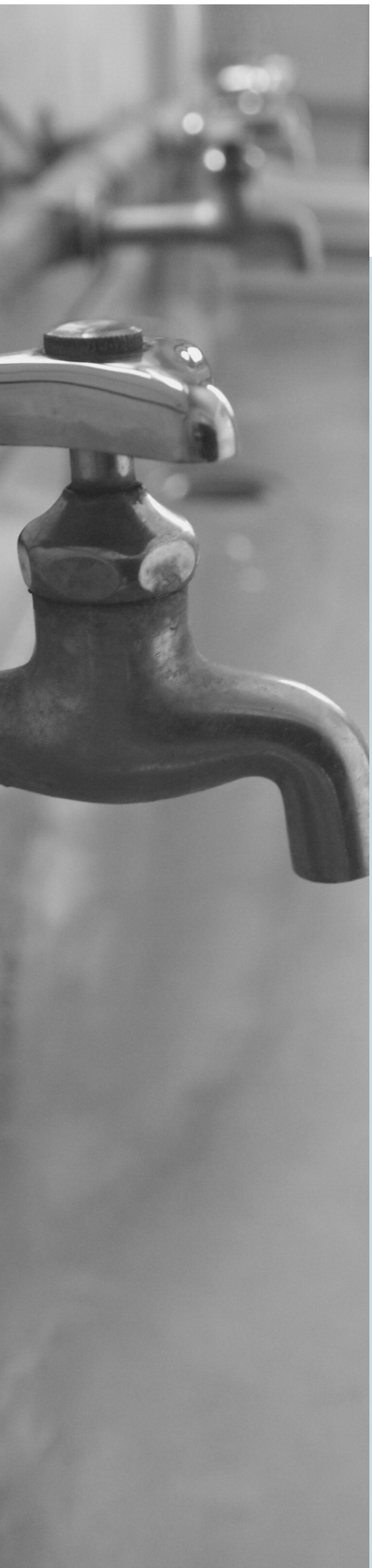



## THE PALOUSE BASIN ENTITIES PUMP ALL OF THEIR WATER FROM TWO AQUIFERS: WANAPUM (UPPER/SHALLOW AQUIFER) AND THE GRANDE RONDE (LOWER/ DEEP AQUIFER). DID YOU KNOW WATER LEVELS IN THE LOWER AQUIFER ARE DECLINING?




Finding: Knowing where the Palouse gets water and that it is declining is an important part of water education; for establishing a need for supplies and more water conservation. We can build future PBAC materials to educate beyond this point after gaining this insight.

09



# CONSERVATION

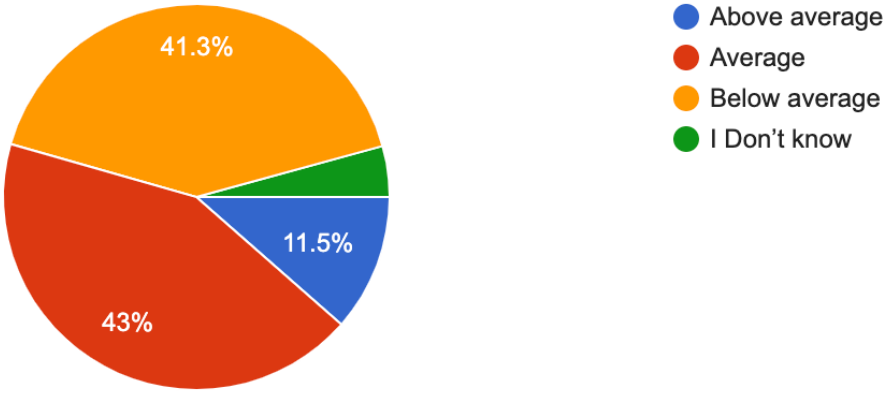
## CONSERVATION IS KEY

***Goal:***

The goal of the following conservation questions was to understand what the public does for conservation, how important it is to them and what resources they might need moving forward.

> *We need more definitive information about the status of the aquifer. How much is left? Our situation could be urgent and we don't know it. I understand that it is very difficult to measure. But knowing this information is imperative for the community to act collectively.*

# HOW DOES YOUR WATER USE COMPARE?



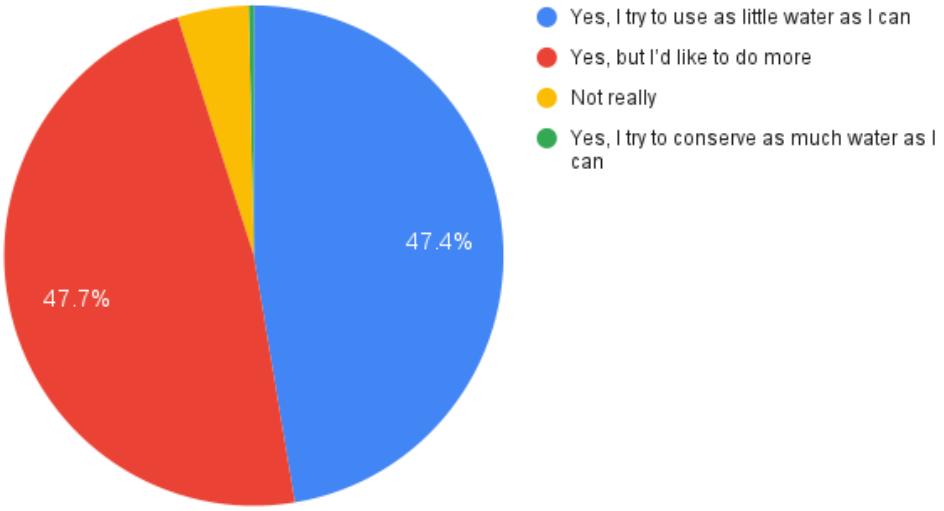

*The declining aquifer was one of my only concerns when our family decided to move back to the area 4-5 years ago. I worry often about the long-term viability of our current usage.*

The residents of Pullman and Moscow use less water per day than the US average per capita. The low water use can be attributed in part to the college student population, many of who live in high-density housing with limited personal yard space. The Cities of Pullman and Moscow also invest in water savings devices and rebate programs to promote low water use. How do you think your water use compares to other residents on the Palouse?

Finding: The majority of people believe they either use an average amount or below average. This could be a great opportunity to create content on how people can change their water behavior and help promote conservation.

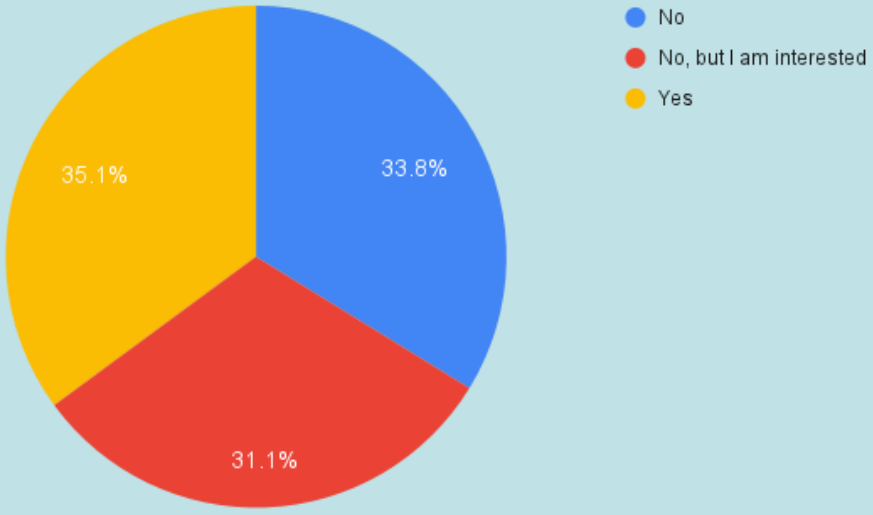
# 11

## IS WATER CONSERVATION IMPORTANT TO YOU?




*I would like to get a pamphlet in my mailbox about all of this and how to be a water-efficient consumer*

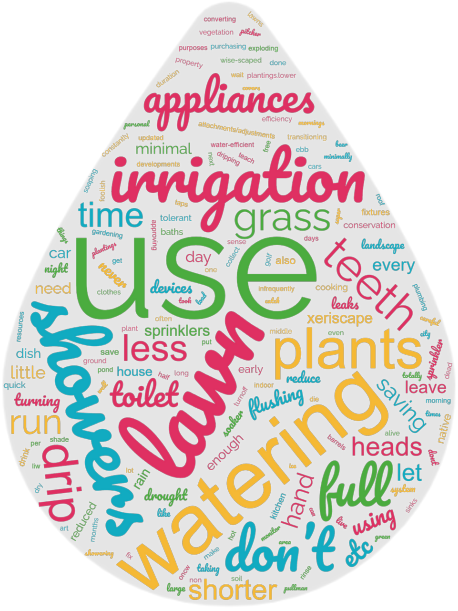
## THE CITIES OF MOSCOW AND PULLMAN HAVE WATER-CONSERVATION PROGRAMS, WHICH INCLUDE DISTRIBUTION OF WATER SAVING DEVICES, LOW WATER-USE LANDSCAPE, AND LOW-FLOW TOILET REBATES. HAVE YOU PARTICIPATED IN ANY OF THESE PROGRAMS ?




Finding: The public expressed that water conservation is important to them and they want to do more. They also expressed interest in the city water conservation programs, suggesting an opportunity to expand those programs.

# CONSERVATION EFFORTS

*Low flow shower head, no watering of lawn, hand wash dishes with non running water*




13

# ADDITIONAL QUESTIONS

**EXPECTATIONS**

Give people the opportunity to express questions, comments, and concerns

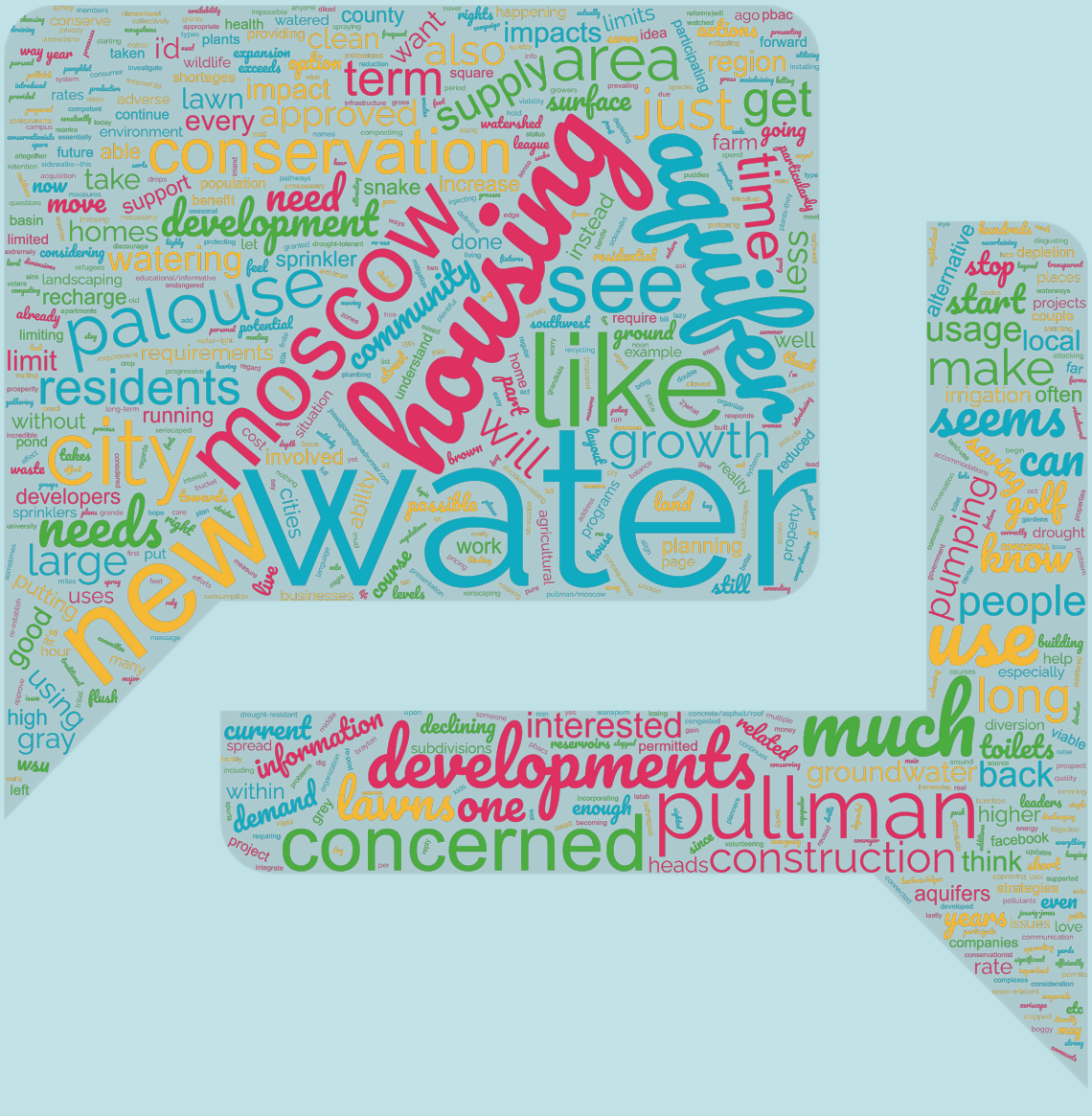
> *We have enough water. We just need to make it accessible. Surface water retention and diversion, even if just for irrigation water in Moscow and Pullman, would go a long way to solving issues.*

14

# QUESTIONS, COMMENTS AND CONCERNS

**52% OF RESPONDANTS SAID THEY WANT TO BE MORE INVOLVED**

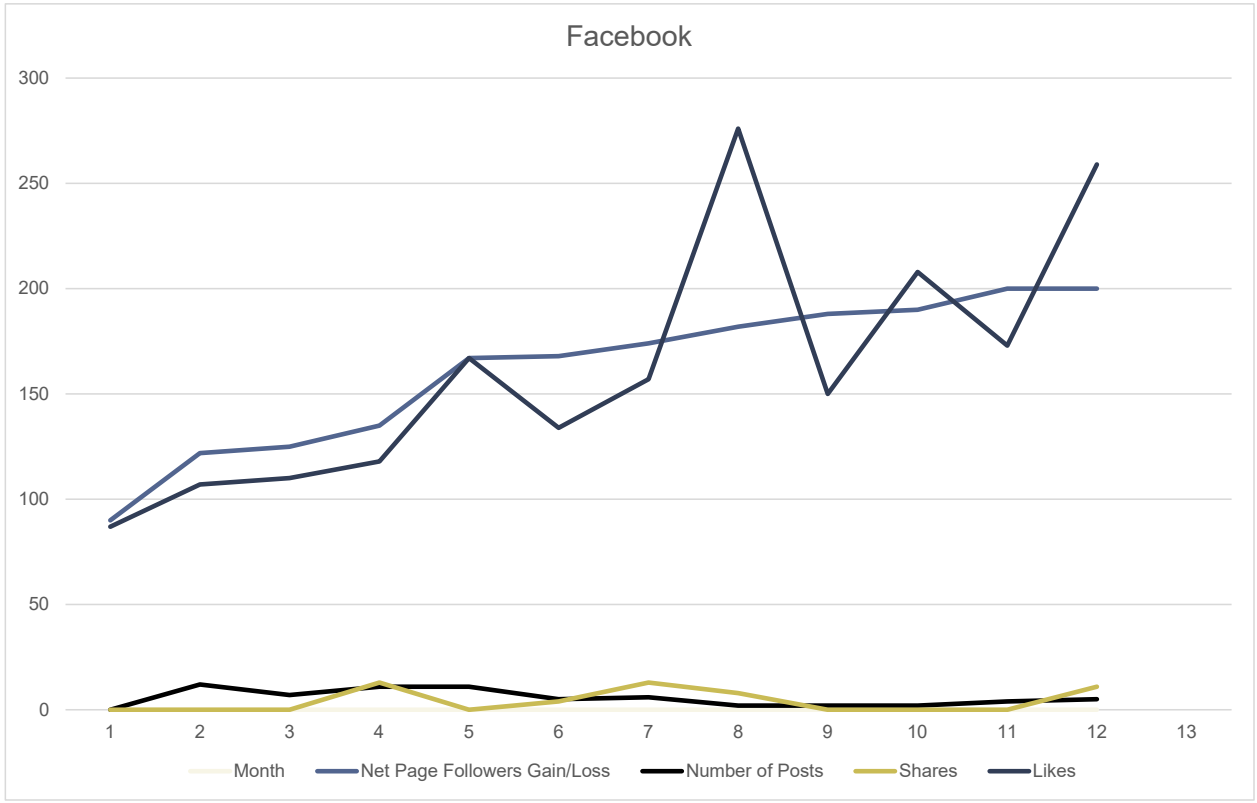
> *I am very concerned about the increasing development that turns un-watered agricultural land, and into housing where people and lawns use water.*



# Appendix D
# Social Media Analytics

# Facebook Analytics

| Month | Net Page Followers Gain/Loss | Number of Posts | Shares | Likes | Link Clicks | Website | Reach | Engagement | Video Views |
|---|---|---|---|---|---|---|---|---|---|
| March 2021 | 90 | - | 0 | 87 | 0 | 0 | 0 | 0 | 0 |
| April 2021 | 122 | 12 | 0 | 107 | 9 | 7 | 375 | 0 | 0 |
| May 2021 | 125 | 7 | 0 | 110 | 4 | 0 | 63 | 0 | 0 |
| June 2021 | 135 | 11 | 13 | 118 | 24 | 0 | 459 | 96 | 0 |
| July 2021 | 167 | 11 | 0 | 167 | 57 | 0 | 922 | 224 | 0 |
| August 2021 | 168 | 5 | 4 | 134 | 18 | 0 | 759 | 156 | 0 |
| September 2021 | 174 | 6 | 13 | 157 | 84 | 0 | 1,961 | 134 | 0 |
| October 2021 | 182 | 2 | 8 | 276 | 25 | 0 | 1,090 | 37 | 0 |
| November 2021 | 188 | 2 | 0 | 150 | 3 | 0 | 89 | 3 | 0 |
| December 2021 | 190 | 2 | 0 | 208 | 1 | 0 | 122 | 8 | 0 |
| January 2022 | 200 | 4 | 0 | 173 | 0 | 0 | 247 | 9 | 0 |
| February 2022 | 200 | 5 | 11 | 259 | 63 | 0 | 3,887 | 87 | 0 |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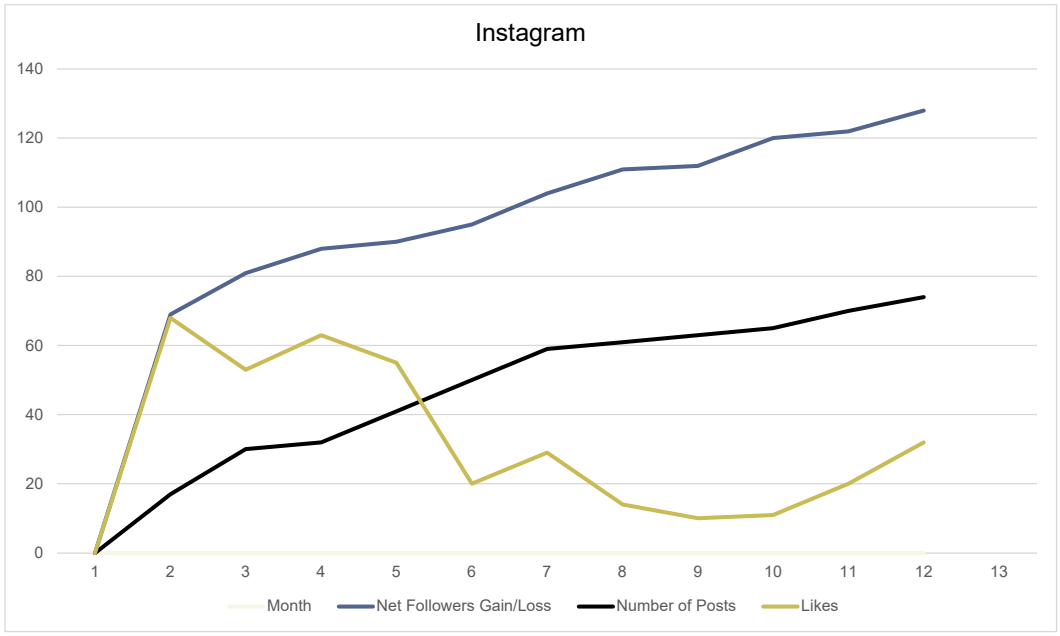
Month
Net Page Followers Gain/Loss
Number of Posts
Shares
Likes

# Instagram Analytics

| Month | Net Followers Gain/Loss | Number of Posts | Likes | Comments | Impressions | Reach | Engagements | Bio Link Clicks | Video Views | Story Views |
|---|---|---|---|---|---|---|---|---|---|---|
| March 2021 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| April 2021 | 69 | 17 | 68 | 5 | 991 | 323 | 82 | 0 | 0 | 99 |
| May 2021 | 81 | 30 | 53 | 4 | 1,217 | 425 | 166 | 0 | 0 | 60 |
| June 2021 | 88 | 32 | 63 | 5 | 1,662 | 202 | 51 | 0 | 0 | 110 |
| July 2021 | 90 | 41 | 55 | 0 | 1,567 | 708 | 55 | 0 | 0 | 409 |
| August 2021 | 95 | 50 | 20 | 1 | 3,256 | 180 | 21 | 0 | 0 | 120 |
| September 2021 | 104 | 59 | 29 | 3 | 1,257 | 391 | 31 | 0 | 0 | 128 |
| October 2021 | 111 | 61 | 14 | 0 | 5,609 | 94 | 14 | 0 | 0 | 0 |
| November 2021 | 112 | 63 | 10 | 0 | 590 | 67 | 10 | 0 | 0 | 0 |
| December 2021 | 120 | 65 | 11 | 0 | 630 | 70 | 11 | 0 | 0 | 0 |
| January 2022 | 122 | 70 | 20 | 0 | 1,089 | 139 | 20 | 0 | 0 | 0 |
| February 2022 | 128 | 74 | 32 | 0 | 5,098 | 184 | 32 | 0 | 0 | 0 |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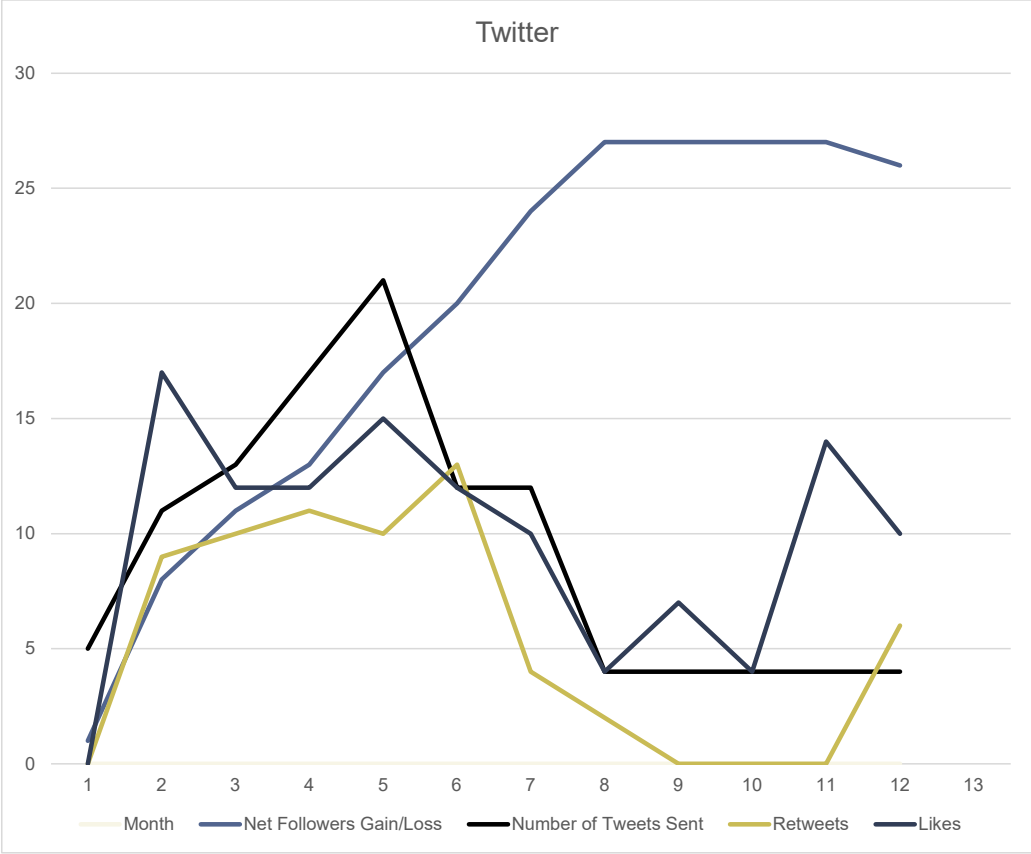
Month
Net Followers Gain/Loss
Number of Posts
Likes

# Twitter Analytics

| Month | Net Followers Gain/Loss | Number of Tweets Sent | Retweets | Likes | Profile Visits | Mentions | Number of Comments | Link Clicks | Tweet Impressions |
|---|---|---|---|---|---|---|---|---|---|
| March 2021 | 1 | 5 | 0 | 0 | 231 | 0 | 0 | 0 | 98 |
| April 2021 | 8 | 11 | 9 | 17 | 834 | 1 | 0 | 5 | 2,755 |
| May 2021 | 11 | 13 | 10 | 12 | 919 | 0 | 3 | 6 | 2,834 |
| June 2021 | 13 | 17 | 11 | 12 | 626 | 1 | 0 | 9 | 1,865 |
| July 2021 | 17 | 21 | 10 | 15 | 549 | 1 | 0 | 5 | 3,149 |
| August 2021 | 20 | 12 | 13 | 12 | 616 | 1 | 0 | 4 | 1,515 |
| September 2021 | 24 | 12 | 4 | 10 | 549 | 0 | 0 | 3 | 2,369 |
| October 2021 | 27 | 4 | 2 | 4 | 256 | 1 | 0 | 5 | 1,115 |
| November 2021 | 27 | 4 | 0 | 7 | 100 | 1 | 0 | 7 | 1,000 |
| December 2021 | 27 | 4 | 0 | 4 | 45 | 0 | 0 | 3 | 2,467 |
| January 2022 | 27 | 4 | 0 | 14 | 239 | 5 | 0 | 2 | 3,657 |
| February 2022 | 26 | 4 | 6 | 10 | 768 | 6 | 0 | 4 | 4,530 |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Month
Net Followers Gain/Loss
Number of Tweets Sent
Retweets
Likes

# Appendix E
# Summary of PBAC-Ecology Discussion June 7, 2021

Alta
Science & Engineering, Inc.

alta-se.com

220 East Fifth Street, Suite 325
Moscow, Idaho 83843
Ph: (208) 882-7858; Fax: (208) 883-3785

# M E M O R A N D U M

**To:** Paul Kimmell, PBAC
Korey Woodley, PBAC
Cara Haley, PBAC and City of Pullman
Kevin Gardes, PBAC and City of Pullman
Jamie Short, Ecology
Patrick Cabbage, Ecology
Dan Tolleson, Ecology
Perrin Robinson, Jacobs
Julia Long, Jacobs
Jason McCormick, McCormick Water Strategies

**From:** Robin Nimmer, Alta

**Date:** June 11, 2021

**Alta Project No.:** 20008

**Subject:** **Summary of PBAC-Ecology Water Supply Alternatives Discussion on June 7, 2021**

On June 7, 2021 members of the Palouse Basin Aquifer Committee (PBAC), PBAC's consultant team, and Washington State Department of Ecology (Ecology) met via Zoom. The purpose of the meeting was to provide an update to Ecology on the PBAC water supply alternatives project and begin discussions on water supply alternatives planning and implementation elements. Those in attendance included:

- PBAC members (Korey Woodley, Paul Kimmell, Cara Haley, and Kevin Gardes),
- Alta Science and Engineering, Inc. (Robin Nimmer)
- Jacobs (Perrin Robinson, Julia Long)
- McCormick Water Strategies (Jason McCormick)
- Washington State Department of Ecology (Jamie Short, Patrick Cabbage, and Dan Tolleson)

## 1 Meeting Notes

### 1.1 Introductions

Paul Kimmell began the meeting with introductions.

### 1.2 Palouse Water Alternatives and Project Update

Robin Nimmer presented on the Palouse Water Supply Alternatives Descriptions and Project update. Current project status includes:

- Community outreach and implementation of a Stakeholder Engagement Group (SEG).
- Water rights investigation in Idaho and Washington
- Development of water supply alternatives interim steps
- Funding investigation

## 1.3 Discussion Items

### *1.3.1 Recent Washington Water Rights Transactions in Palouse Basin*

Jason McCormick described his work on the Washington water rights. He discussed his findings for large scale water rights transactions in Washington; Ecology noted they were not aware of any others aside from within-WSU transfers.

Also discussed Snake River water rights. It is very difficult to get upstream water transfers (i.e. Snake River below Lower Granit Dam), not the first path to pursue. Ecology has not appropriated new water rights on the Snake River in the Lewiston/Clarkston area since the 1980s because of fish and wildlife concerns (Washington Department of Fish and Wildlife [WDFW], National Oceanic Atmospheric Administration [NOAA], and US Fish and Wildlife [USFWS]) and therefore lack of support; however, water is available in the flow rule. There are some pending water rights applications on the Snake River in the area that are small scale. Dan suggested that new water right appropriations from the Snake River will likely be more difficult than other surface water sources.

### *1.3.2 Bi-State Water Management, Comparable Examples, Lessons Learned*

- Ecology's priorities: Palouse Basin hasn't seen a lot of activity for water rights. Priorities can shift once a water supply alternative is selected. At that point Ecology can have a more focused conversation with PBAC.
- Walla Walla Basin: Closest-related project is in the Walla Walla basin with Washington-Oregon, Tri-sovereign: Oregon, Washington, and Umatilla Tribe. They are at a similar project stage of discussions as the Palouse Basin, so there are no other projects to use as a guide.
- Not as familiar with the Rathdrum Prairie/Spokane Valley aquifer area water transfers. However, generally water is not transferred, Washington is just downstream of Idaho for groundwater and surface water. The two states work together to share data. There are a few old cases where water in the Newport, WA area was conveyed and/or transferred from Idaho to Washington, but these were before statehoods.
- Currently no bi-state management of the Snake River, no shared administration.
- There are currently no mechanisms for bi-state water transfer in Washington or Idaho. This would require state legislation for both states. However, Oregon may have some legislation/state code for this, which could be used as a guidance.
- Engage with fisheries managers.
    - State fish and wildlife agencies for the North and South Forks of the Palouse River.
    - State, federal, and tribal fish agencies. The Tribe depends on the water source.
    - Ecology is happy to participate in these meetings. Ecology takes recommendations from the fisheries managers when evaluating permitting decisions.

### *1.3.3 Identify Potential Washington State Funding for Regional Water Supply Development*

- Other state grants include:
  - Stream Flow Restoration (SRA) Grants – funding for feasibility and implementation where water is being managed to solve local needs and fish.
  - Acquisitions Basin of Origin – new program (est. 2021) not yet defined but coming soon. $14 million, first come first served. Rural counties. Whitman County meets the rural definition. Intended targets are for shovel-ready projects.
  - Office of Columbia River – water supply development funds in the Columbia Basin.
  - Watershed Planning Implementation and Flow Achievement Grants – no longer a program. Replaced by SRA.
  - Three state revolving loan funds – if show beneficial use, greater chance to get funding.
- Contact Annie Sawabini, Streamflow Restoration Grant Program, sfrprjgrants@ecy.wa.gov, 360-701-4432, with questions about SRA Grant applications.

## 2 Key Takeaways

Below are key takeaways from the meeting:

- Ecology is pleased with the work PBAC has done and is interested in continuing the conversation. Until an alternative is selected it is difficult to provide specific feedback. After an alternative is selected, engage with Ecology, then engage with Office of Columbia River (OCR). OCR will be looking for Ecology's support.
- Columbia River Basin 2021 Long-Term Water Supply & Demand Forecast draft raises the level of concern for the Palouse Basin for OCR.
- Biggest obstacles:
  - Potential fish agencies reluctance for new water rights
  - Legislation for bi-state water management and allocation
- Engage with federal, state, and tribal fisheries managers as a first next step.

# Appendix F
# Water Rights Investigations for Idaho and Washington

SPF WATER ENGINEERING

# MEMORANDUM

**DATE:** March 17, 2021

**TO:** Robin Nimmer (Alta Science and Engineering)

**FROM:** Scott King, Lori Graves, Terry Scanlan, Steve Hannula

**PROJECT NO:** 1619.0010

**RE**: Water Right Review for Palouse Groundwater Basin Water Supply Alternatives

## A. Introduction

SPF Water Engineering (SPF), as subconsultant to Alta Science and Engineering (Alta), is working for the Palouse Basin Aquifer Committee (PBAC) to assist in understanding Idaho water rights as they relate to the alternative water supplies for Moscow and Pullman.

PBAC has identified four water supply alternatives through the Palouse Groundwater Basin Water Supply Alternatives Analysis Project. The project resulted in the March 2017 report titled "Palouse Groundwater Basin Water Supply Alternatives Analysis Report – Summary" (2017 WSAA) which summarized the four water supply alternatives for the Moscow, Idaho and Pullman, Washington municipal water supply systems.

PBAC is now working toward developing these alternatives into actionable projects. One of the action items that needs to be completed early in the project life cycle is the acquisition of water rights necessary for each alternative. In the memorandum herein, SPF describes the state's water right process for acquiring water rights and the likely challenges PBAC should anticipate.

For each water supply alternative, the 2017 WSAA report included a description of the water source, approximate diversion location, the use of the water, and the time of year when the water would be used. These elements are the basis for acquiring a water right and will be scrutinized by the Idaho Department of Water Resources (IDWR) when reviewing PBAC's applications.

The four alternatives are included in Table 1, but only the alternatives with diversion within Idaho are considered in this memorandum. The alternatives with points of diversion in Washington (from the Snake River, South Fork Palouse River, and North Fork Palouse River) are considered by others.

Table 1. Summary of Alternative Water Supplies.

| Alt. | Diversion Source | Diversion Location | Use of Water | Time of Year |
|---|---|---|---|---|
| 1 | Snake River | Wawawai Park in Washington | 10 cfs: Treatment and direct use in Pullman and Moscow | Year-around |
| 2 | Paradise Creek or S. Fork Palouse | Near Moscow, ID | 4.6 cfs: Aquifer recharge in Moscow | Winter-spring |
| | N. Fork Palouse River | Town of Palouse, WA | 10 cfs: Treatment and direct use in Pullman and Moscow | Year-around |
| 3 | S. Fork Palouse | Above Pullman, WA | 10 cfs: Municipal use in Pullman | Winter-spring |
| | Flannigan Ck | New storage reservoir, ID (Moscow Mtn.) | 6,600 ac-ft: Storage, 10 cfs diversion from storage, re-diversion, municipal use in Moscow | Year-around |
| 4 | Wastewater | Moscow WWTP, ID | Aquifer recharge in Moscow | Year-around |
| | Wastewater | Pullman WWTP, WA | Municipal use in Pullman | Year-around |
| | Paradise Ck | Above Moscow, ID | 4.6 cfs: Aquifer recharge in Moscow | Winter-spring |
| | S. Fork Palouse | Above Pullman, WA | 4.6 cfs: ASR in Pullman | Winter-spring |

## B. Water Right Transactions

The following summarizes the Idaho water right investigation as it relates to the appropriation of new water rights or acquisition of existing water rights, and the transactional processes anticipated to prepare the way for PBAC's phased implementation of one or more of the alternative supplies.

The alternatives listed in Table 1 can only be implemented if the appropriate water rights are in place authorizing the diversion and use of the water. Each alternative listed will need a water right transaction with IDWR or with the Washington Department of Ecology (WDOE). The water right processes described below are related to Flannigan Creek, Paradise Creek, and South Fork Palouse River only. Water right issues related to diversions from the rivers in Washington, or interstate water use or conflicts, will be addressed by others.

Currently, new appropriations from Flannigan Creek, Paradise Creek, and South Fork Palouse River in Idaho are allowed; IDWR does not have rules or policies in place prohibiting new appropriations for surface water in those basins.

Because the watersheds are open for new appropriations, PBAC could file an *Application for Permit* for each system being developed to identify how water will be diverted and put to use. Alternatively, if PBAC were to acquire an existing water right, then an *Application for Transfer* would be needed to redefine the existing water right to the proposed new use.

IDWR will consider the application(s) for completeness and will advertise the applications for public comment. Through the public notice process, local water users have the opportunity to protest a new application if they think the appropriation would affect their water right. To minimize the risk of having a protest lodged against the application(s), PBAC could offer public meetings in advance to alert other water users of the project's water right needs and determine if any conflicts exist.

IDWR is currently conducting the Palouse Basin Adjudication (PBA) as Phase 2 of the North Idaho Adjudication. Partial decrees for uncontested claims are anticipated to be issued by the court in spring 2022. The PBA process should not directly affect PBAC's new appropriations, but the inventory of water rights in Basin 87 (i.e., the Palouse River basin) will be more fully understood as the PBA advances.

Washington Department of Ecology will have a similar application process for diversions from South Fork Palouse River for use in Pullman. Similarly, Washington will also require an application process for the aquifer storage and recovery alternative being considered in Pullman.

## C. Opportunities, Constraints or Fatal Flaws

From a water right perspective, there is opportunity to appropriate new water supplies with the constraint that the public will have an opportunity to be involved and may result in a protest. Often the protests can be resolved through an understanding of the issues and solutions proposed as part of the water right approval process.

## D. Water Right Acquistion

PBAC has the opportunity to either seek new appropriations or buy an existing portfolio of rights. Buying existing water rights and transferring them to the new uses would likely be a more expensive option, but may considered under certain circumstances. For example, in the event protests are lodged against PBAC and no other solution is agreed upon, or if existing rights have already appropriated the available streamflow, acquisition of existing rights might be a favored approach.

To gain an understanding of what water rights are potentially available for acquisition, the IDWR on-line database was queried to list water rights that met certain criteria. Water rights that are in the Palouse River watershed, Paradise Creek, and South Fork Palouse River are listed in Tables 2, 3, and 4 respectively, and consist of surface water rights with

diversion rates of 0.10 cfs or greater or annual volumes of 10-acre feet or more. The tables specifically exclude ground water rights, surface water runoff rights, waste water rights, and mining water rights. Water rights that did not meet these selection criteria would be too small for PBAC's needs or would not have an amount of consumptive use adequate for PBAC projects and therefore, would not be candidates for acquisition.

The locations of points of diversion for the water rights listed in Tables 2, 3, and 4 are shown for each watershed in Figures 1, 2, and 3.

Although a point of diversion from the Palouse River is not proposed, Table 2 and Figure 1 include water rights for the entire Palouse River watershed because the watershed includes Flannigan Creek. Palouse River rights outside of Flannigan Creek could potentially be used to mitigate Flannigan Creek appropriations, or could influence the ability to appropriate water from Flannigan Creek. Review of Table 2 and Figure 1 shows three small irrigation water rights on the Palouse River downstream of Flannigan Creek; only one of these rights have been claimed in the PBA. Although these water rights would be senior to an appropriation from Flannigan Creek, they are so small (totaling less than 1 cfs in the aggregate) that they are unlikely to be a constraint on a Flannigan Creek appropriation. There is also one water right on a tributary to Flannigan Creek. It is also unclaimed and so small (1 acre irrigation) as to not be a constraint on appropriation.

Only seven water rights meeting the selection criteria were identified in the Paradise Creek watershed (Table 3). Two are permits for wildlife storage that are unlikely to be a constraint on watershed yield. Two are unclaimed rights for domestic and stock uses that are likely abandoned, and would not be a constraint even if active. One claimed right for irrigation (14.2 acres), domestic, and fire protection is small enough to not significantly impact downstream uses. Lastly, two irrigation water rights at the University of Idaho totaling 0.92 cfs could be a minor to constraint on appropriations during low-flow periods, but would not conflict with appropriations during springtime when flows are high and irrigation demands are low.

Only seven water rights meeting the selection criteria were identified in the South Fork Palouse River watershed (Table 4). Three are claims for irrigation (20, 30, and 5 acres) and one is a permit for irrigation (3 acres) and storage; none of these are likely to be a constraint on watershed yield. Two are unclaimed rights for irrigation that are likely abandoned, and would not be a constraint even if active. The last is an unclaimed right based on a 1976 statutory claim (i.e., an unperfected right) by Latah County for a diversion rate of 470 cfs and 135,380-acre feet at Robinson Lake. Robinson Lake no longer exists and is now the site of Robinson Park. As a result, we assume that this water right is abandoned and will not impact new appropriations from the South Fork Palouse River.

Table 2. Water Rights in the Palouse River Watershed Meeting Selection Criteria.

| Map # | Water Right | Basis | Claimed | Priority Date | Diversion Rate (cfs) | Storage Volume (ac-ft) | Water Use | Acres | Source | Tributary | Owner of Record |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 87-2009 | License | Yes | 6/16/1953 | 0.24 | | IRRIG | 30.0 | HATTER CR | PALOUSE R | SHEPHERD HILLS |
| 2 | 87-2010 | License | Yes | 6/16/1953 | 0.24 | | IRRIG | 30.0 | PALOUSE R | SNAKE R | SHEPHERD HILLS |
| 3 | 87-2020 | License | Yes | 6/10/1963 | 1.30 | | IRRIG | 215.0 | PALOUSE R | SNAKE R | JEREMY D BOECKNER |
| 4 | 87-2028 | License | Yes | 2/15/1967 | 0.27 | | IRRIG | 27.0 | PALOUSE R | SNAKE R | JUANITA F MANTZ |
| 5 | 87-4000 | Statutory Claim | Yes | 6/10/1958 | 0.12 | | IRRIG, STOCK | 4.0 | CRANE CR | GOLD CR | WILLIAM JOHNSON |
| 6 | 87-7070 | License | Yes | 4/2/1981 | 0.98 | 6.0 | INDUST, DOM, FP, STORAGE | | PALOUSE R | SNAKE R | BENNETT LUMBER PRODUCTS INC |
| 7 | 87-7122 | License | Yes | 6/6/1986 | 0.20 | 18.3 | REC STORAGE | | PALOUSE R | SNAKE R | INLAND NORTHWEST COUNCIL ENDOWMENT FOUNDATION LLC |
| 8 | 87-7199 | License | Yes | 7/16/1996 | 0.13 | 3.3 | WILDLIFE, REC, STORAGE | | UNNAMED STREAM | HATTER CR | DENNY DAWES |
| 9 | 87-10018 | License | Yes | 11/7/2001 | 0.14 | | IRRIG | 7.0 | PALOUSE R | SNAKE R | GERALD H BATES |
| 10 | 87-10071 | License | Yes | 2/22/2011 | 0.20 | 25.0 | IRRIG, STOCK, STORAGE | 8.0 | LONG CR | HATTER CR | MARK CORRAO |
| 11 | 87-11231 | Beneficial Use | Yes | 12/31/1900 | 0.25 | | STOCK | | PALOUSE R | SNAKE R | SWEETWATER RANCH LLC |
| 12 | 87-11510 | Beneficial Use | Yes | 12/31/1953 | 0.00 | 17.1 | IRRIG, REC, STORAGE | 4.0 | UNNAMED STREAM | GNAT CR | TIMOTHY V STEURY |
| 13 | 87-11785 | Beneficial Use | Yes | 8/6/1947 | 0.20 | | INDUST, FP | | CABIN GULCH CR | MEADOW CR | POTLATCHDELTIC FOREST HOLDINGS INC |
| 14 | 87-11786 | Beneficial Use | Yes | 8/6/1947 | 0.20 | | INDUST, FP | | MEADOW CR | PALOUSE R | POTLATCHDELTIC FOREST HOLDINGS INC |
| 15 | 87-11787 | Beneficial Use | Yes | 8/6/1947 | 0.20 | | INDUST, FP | | MEADOW CR | PALOUSE R | POTLATCHDELTIC FOREST HOLDINGS INC |
| 16 | 87-11788 | Beneficial Use | Yes | 8/6/1947 | 0.20 | | INDUST, FP | | PALOUSE R | SNAKE R | POTLATCHDELTIC FOREST HOLDINGS INC |
| 17 | 87-12212 | Statutory Claim | Yes | 6/1/1919 | 0.19 | 8.0 | STOCK, STORAGE | | MF DEEP CR, DEEP CR | DEEP CR, PALOUSE R | MC MURRAY & SON LUMBER LIMITED PARTNERSHIP |
| 18 | 87-12213 | Statutory Claim | Yes | | | | | | | | |
| 19 | 87-2007 | License | No | 4/10/1952 | 0.28 | | IRRIG | 24.0 | HATTER CR | PALOUSE R | IRWIN W MINDEN |
| 20 | 87-2008 | License | No | 9/30/1952 | 0.40 | | IRRIG | 52.0 | PALOUSE R | SNAKE R | M E BECKER |
| 21 | 87-2011 | License | No | 2/10/1965 | 0.26 | | IRRIG | 14.0 | PALOUSE R | SNAKE R | ERNEST NYGAARD |
| 22 | 87-2021 | License | No | 2/3/1964 | 0.25 | | IRRIG | 30.0 | HATTER CR | PALOUSE R | L P HADALLER |
| 23 | 87-4001 | Statutory Claim | No | 2/10/1949 | 1.00 | 9.2 | INDUST, | | PALOUSE R | SNAKE R | BENNETT LUMBER PRODUCTS INC |
| 24 | 87-4034 | Statutory Claim | No | 6/1/1905 | 0.45 | | INDUST | | PALOUSE R | SNAKE R | POTLATCH CORP |
| 25 | 87-4052 | Statutory Claim | No | 6/1/1919 | 0.19 | | STOCK | | MF DEEP | DEEP CR | MC MURRAY & SON |
| 26 | 87-4055 | Statutory Claim | No | 9/1/1910 | 0.12 | | IRRIG, DOM | 4.0 | JEROME CR | PALOUSE R | NIKKI J SHOCKLEY |
| 27 | 87-4141 | Statutory Claim | No | 6/1/1900 | 0.12 | | IRRIG, STOCK, | 3.0 | SPRINGS | ROCK CR | SHERMAN HARRISON |
| 28 | 87-4151 | Statutory Claim | No | 6/1/1969 | 0.32 | | IRRIG, STOCK | 15.0 | PALOUSE R | SNAKE R | SHERRY NYGAARD |
| 29 | 87-4154 | Statutory Claim | No | 5/10/1969 | 0.38 | 0.2 | IRRIG, DOM, STOCK, REC, STORAGE | 1.0 | UNNAMED STREAM | FLANNIGAN CR | RUTH A ELLIOTT |
| 30 | 87-7047 | License | No | 5/30/1978 | 0.14 | | IRRIG, STOCK, | 4.0 | JEROME CR | PALOUSE R | JEREMY D BOECKNER |
| 31 | 87-10036 | Statutory Claim | No | 1/1/1900 | 0.10 | | STOCK | | PALOUSE R | SNAKE R | BRUCE LEIBOLD |
| 32 | 87-10066 | Statutory Claim | No | 12/31/1900 | 0.25 | | STOCK | | PALOUSE R | SNAKE R | LEIBOLD LIVING TRUST |
| 33 | 87-10067 | Statutory Claim | No | 12/31/1900 | 0.25 | | STOCK | | PALOUSE R | SNAKE R | S V V WEST |
| 34 | 87-10068 | Statutory Claim | No | 12/31/1900 | 0.25 | | STOCK | | PALOUSE R | SNAKE R | S V V WEST |
| 35 | 87-10104 | Permit | n/a | 3/11/2019 | 0.50 | | IRRIG, STOCK | 24.0 | PALOUSE R, UNNAMED STREAM | SNAKE R, PALOUSE R | WEST FORK POTLATCH LLC |
| 36 | 87-10938 | Permit | n/a | 6/12/2019 | 0.00 | 11.5 | IRRIG, STOCK REC, STORAGE | 1.0 | SPRING | SINKS | WILLIAM E BIRD |

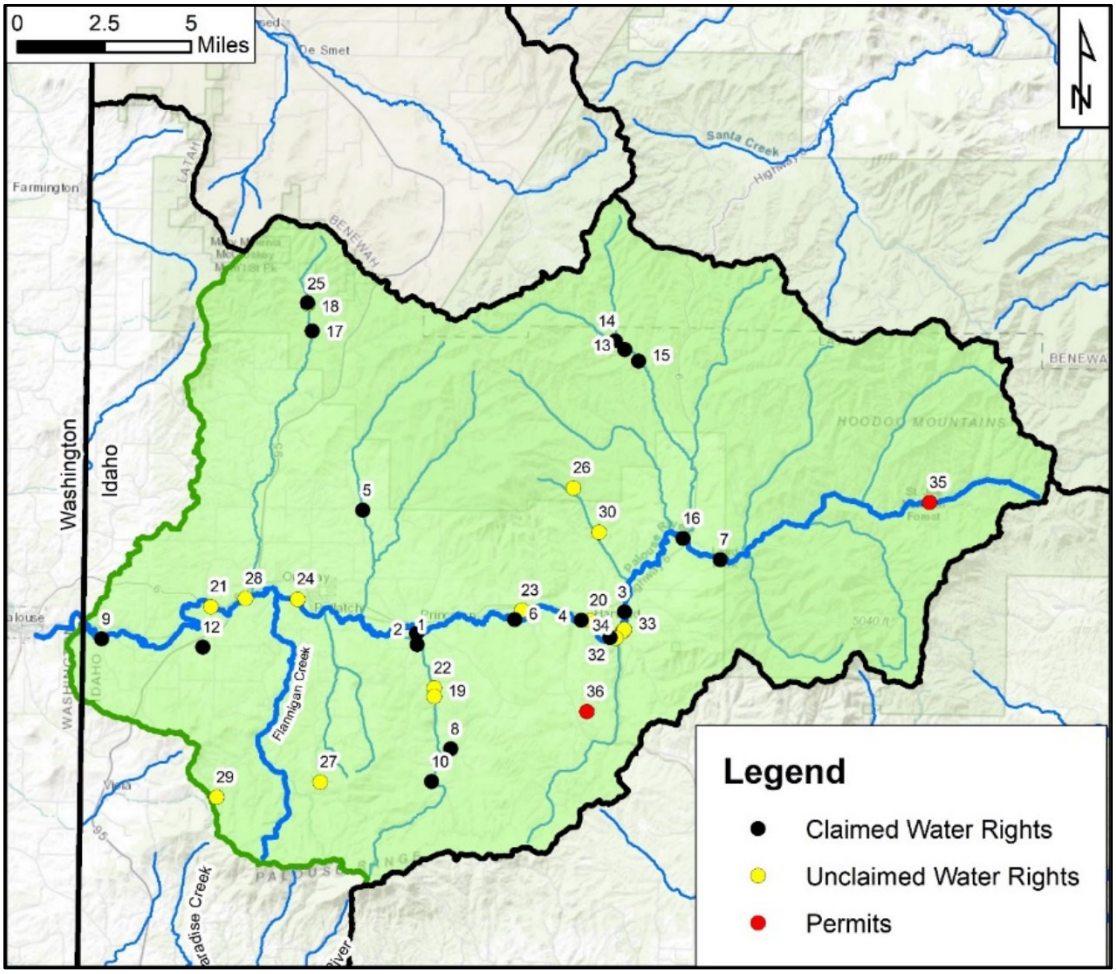



Figure 1. Palouse River Watershed Water Rights Meeting Selection Criteria.

Table 3. Water Rights in the Paradise Creek Watershed Meeting Selection Criteria.

| Map # | Water Right | Basis | Claimed | Priority Date | Diversion Rate (cfs) | Storage Volume (ac-ft) | Water Use | Acres | Source | Tributary | Owner of Record |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 87-2014 | License | Yes | 4/21/1955 | 0.51 | | IRRIG | 26.0 | PARADISE CR | SF PALOUSE R | BOARD OF REGENTS OF THE UNIVERSITY OF IDAHO |
| 2 | 87-2018 | License | Yes | 5/7/1957 | 0.41 | | IRRIG | 20.5 | PARADISE CR | SF PALOUSE R | BOARD OF REGENTS OF THE UNIVERSITY OF IDAHO |
| 3 | 87-10120 | Beneficial Use | Yes | 9/26/2004 | 0.56 | 2.0 | IRRIG, DOM, FP, STORAGE | 14.2 | UNNAMED STREAM, GROUND WATER | IDLERS CR | ANDREW HOEHN |
| 4 | 87-4030 | Statutory Claim | No | 6/1/1930 | 0.18 | | STOCK, DOM | | SPRING | SINKS | JACK F TRUITT |
| 5 | 87-4173 | Statutory Claim | No | 6/1/1960 | 0.00 | 10.0 | STOCK, DOM, STORAGE | | UNNAMED STREAM | POND | NANCY ANN TORBECK |
| 6 | 87-10092 | Permit | n/a | 3/8/2018 | 0.00 | 25.0 | IRRIG, WILDLIFE, FP, STORAGE | 6.0 | SPRING, UNNAMED STREAM | PARADISE CR | WARREN FAMILY SURVIVING SPOUSE TRUST |
| 7 | 87-11365 | Permit | n/a | 7/18/2019 | 0.00 | 12.4 | WILDLIFE STORAGE | | UNNAMED STREAM | IDLERS REST CR | GARY J PRESOL |

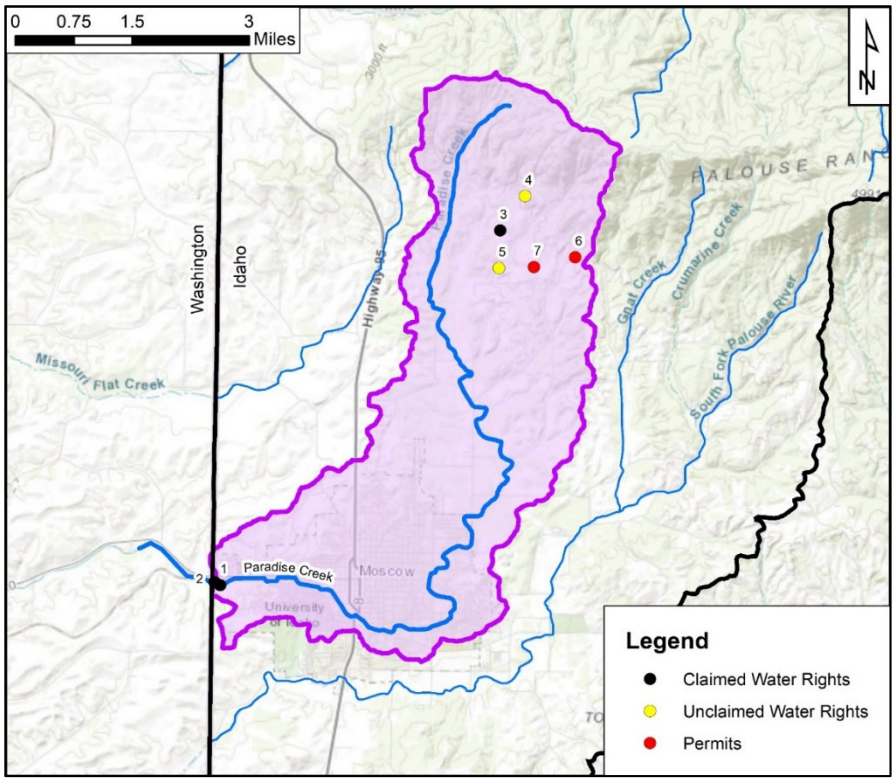



Figure 2. Paradise Creek Watershed Water Rights Meeting Selection Criteria.

Table 4. Water Rights in the South Fork Palouse River Watershed Meeting Selection Criteria.

| Map # | Water Right | Basis | Claimed | Priority Date | Diversion Rate (cfs) | Storage Volume (ac-ft) | Water Use | Acres | Source | Tributary | Owner of Record |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 87-2000 | License | Yes | 11/25/1921 | 0.20 | | IRRIG | 10.0 | CRUMARINE CR | SF PALOUSE R | KTJ LLC |
| 2 | 87-2003 | License | Yes | 9/11/1950 | 0.12 | | IRRIG | 20.0 | PALOUSE R | SNAKE R | ELKS BPOE 249 |
| 3 | 87-4010 | Statutory Claim | Yes | 1/1/1935 | 0.10 | | IRRIG | 5.0 | UNNAMED STREAM | SF PALOUSE R | ERIC JESSUP |
| 4 | 87-4008 | Statutory Claim | No | 12/13/1935 | 470.00 | 135380 | REC, AESTH, STORAGE | | SF PALOUSE R | PALOUSE R | COUNTY OF LATAH |
| 5 | 87-4009 | Statutory Claim | No | 6/1/1956 | 0.13 | 1.3 | IRRIG, STOCK, FP, STORAGE | 40.0 | POND | SINKS | JAMES R LUCAS |
| 6 | 87-10096 | License | No | 6/7/2018 | 0.00 | 14.6 | IRRIG, REC, STORAGE | 3.5 | SPRING, UNNAMED STREAM | SF PALOUSE R | PARADISE RIDGE RETREAT LLC |
| 7 | 87-11020 | Permit | n/a | 7/8/2019 | 0.00 | 14.7 | IRRIG, FP, STORAGE | 3.0 | UNNAMED STREAM | SF PALOUSE R | EDWIN SALISBURY |

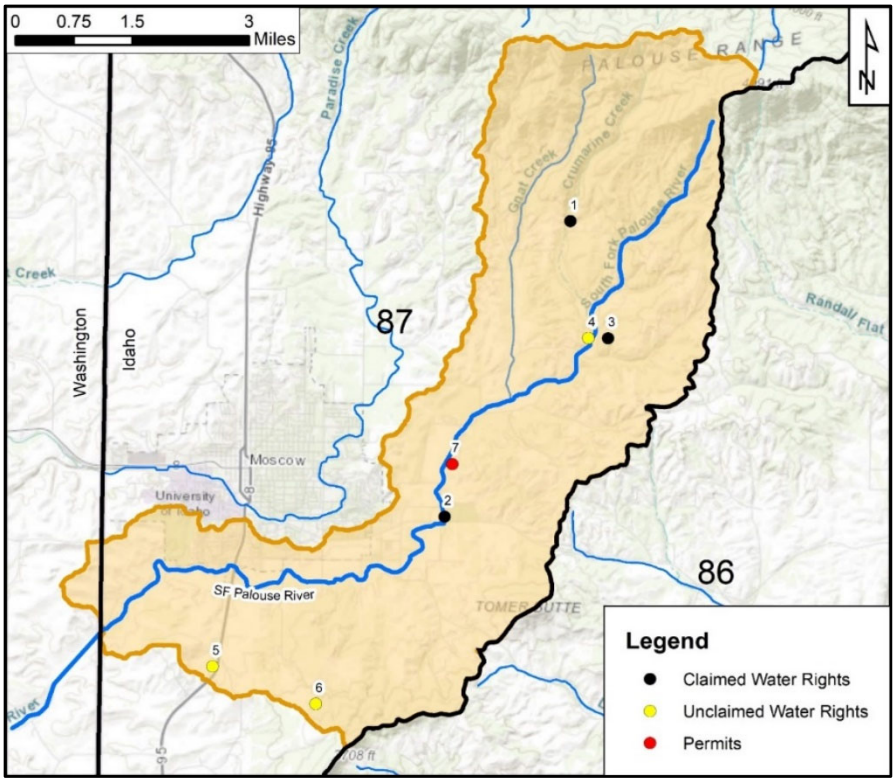



Figure 3. South Fork Palouse River Watershed Water Rights Meeting Selection Criteria.

## E. Idaho-Based Alternatives for Appropriations

Currently, Basin 87 is open for new appropriations and there are no substantial water right candidates for acquisition. Based on that status, PBAC should seek a new appropriation through IDWR for the water supply alternatives.

Permitting costs for appropriation are relatively minimal, consisting of application fees that will range from a few hundred to a few thousand dollars, along with consulting fees to prepare applications. Costs can increase if an application is protested due to the need to retain legal assistance if an administrative hearing is required.

The application timing should be dictated by when PBAC thinks the project can be constructed and water put to use. Once a permit is approved, PBAC will have 5 years to develop the project with a possible 10-year extension (for appropriations greater than 2 cfs) for a total of 15 years for the development period. Even if only a portion of the final buildout is developed within 15 years, PBAC can file a second application for additional water at the end of the development period.

IDWR is the regulatory agency for water rights and injection wells in Idaho. Idaho Department of Environmental Quality (IDEQ) will be involved in an approval process for water quality issues associated with recharge. If the treated water is used directly by Moscow, IDEQ will have review and approval authority as part of the public water system permitting process.

### Paradise Creek and/or South Fork Palouse River – New appropriation for Groundwater Recharge (Alt 2 and Alt 4)

As summarized in Table 1, either Paradise Creek or the South Fork Palouse River are potential sources of surface water.

Appropriation of surface water from either stream will require an application for permit to IDWR. The application could seek water for municipal use, which can include groundwater recharge. Alternatively, the application can seek water for groundwater recharge only if direct municipal use is not contemplated. The season of use would focus on the high runoff period in the winter and spring, although diversion capability should be sought for any period when water is available.

### Flannigan Creek – Storage, Diversion to Storage and Diversion from Storage (Alt 3)

Alternative 3 identifies a possible on-stream storage reservoir on Flannigan Creek in Idaho that is potentially 6,600 acre-feet in volume and a peak diversion rate of 4,100 gpm. The reservoir would store a certain volume from and in Flannigan Creek and release the water to a treatment facility for direct use in Moscow.

PBAC would file an Application for Permit for a new reservoir on Flannigan Creek. The application would list the following purposes of use: municipal, diversion to storage,

municipal storage, and municipal from storage. The application could also list recreation storage as a purpose of use if the reservoir will store water for recreation.

### Wastewater Reuse – Groundwater Recharge in Moscow (Alt 4)

The use of treated wastewater for groundwater recharge falls within the category of municipal use and would not require a separate application for permit so long as the wastewater is routed to the recharge site or direct-use site before the water is released to the normal outfall. Once the water is released back to the public waterway, a new permit would be required to re-acquire the water.

IDEQ regulates wastewater reuse. Idaho's Recycled Water Rules (IDAPA 58.01.17) require anyone wishing to construct, modify, or operate a reuse facility in the state to first obtain a permit from IDEQ. Obtaining a reuse permit may take six months or longer depending on the complexity of the project as well as the submittal and review timelines. The reuse permit application process begins with the applicant scheduling a pre-application meeting with IDEQ. Applicants are then required to submit to IDEQ an application including site-specific information, facility and topographic maps, and reuse-specific information. If use of injection wells is contemplated, injection well permits from IDWR will be required.

## F. Implications of Nez Perce Tribal Claims

The Nez Perce Tribe and the United States on behalf of the Nez Perce Tribe have filed water right claims in the PBA. These claims focus on historic uses of water from springs and creeks for wildlife and fish, uses which are essentially non-consumptive. Similar claims have been filed in the Coeur d'Alene-Spokane River Basin Adjudication (CSRBA) and although a significant number of claims have been filed in the CSRBA, objections have also been made. Negotiations are currently underway and the final outcome of the federal reserved claims are unknown. This process will likely provide a template for the PBA.

The outcome of the federal reserve claims in the PBA could also follow the example established in the Snake River Basin Adjudication (SRBA). The 2004 Snake River Water Rights Agreement resolved issues related to the Nez Perce Tribe's water right claims in the SRBA. In the Salmon and Clearwater basins, for example, the primary goal of the settlement agreement provisions is to conserve and enhance fish habitat in order to address ESA concerns. There are three cornerstones to such efforts: the establishment of state minimum flows, the establishment of a voluntary forestry program with standards to improve fish habitat, and the establishment of voluntary programs by irrigators and other water users to improve instream flow.

Some of the federal reserved claims in the PBA include a minimum stream flow rate. Those claims upstream of the PBAC projects will have no impact to PBAC's plans. However, in the cases where the PBAC projects are upstream of, or within, a minimum stream flow reach, the claims have the potential to impact PBAC's projects. For PBAC's water supply alternatives diverting in Washington, there is no impact from the tribal claims.

Table 5 lists five minimum streamflow claims that have the potential to impact PBAC projects. The stream reaches are identified in Figure 4. Included are claims for Flannigan Creek, Paradise Creek, SF Palouse River, and Palouse River (aka NF Palouse River). Although there are no alternatives proposing diversion from the Palouse River in Idaho, the two claims for Palouse River reaches downstream of Flannigan Creek have the potential to impact diversions from Flannigan Creek.

The claimed amounts in Table 5 correspond to the maximum month streamflow, and actual claimed monthly flows vary according to the natural hydrograph of each stream. For example, the claim for Paradise Creek ranges from a maximum of 33 cfs during March to a minimum of 0.67 cfs in August.

For the claims that may have an impact on alternatives, it is important that the State negotiate subordination provisions for domestic, commercial, municipal, and industrial uses. The final disposition of these claims in the PBA is yet to be determined, but should be monitored closely to ensure that they do not preclude the ability to develop the PBAC alternatives from streams in Idaho.

Table 5. Nez Perce Claims that have Potential to Influence PBAC's New Appropriations.

| Map # (Stream Reach) | Water Right | Basis | Claimed | Priority Date | Diversion Rate (cfs) | Water Use | Source | Owner of Record |
|---|---|---|---|---|---|---|---|---|
| 1 | 87-11997 | Reserved | Yes | n/a | 28.00 | MINIMUM STREAM FLOW | FLANNIGAN CREEK | USA ON BEHALF OF NEZ PERCE TRIBE |
| 2 | 87-11998 | Reserved | Yes | n/a | 1060.00 | MINIMUM STREAM FLOW | PALOUSE RIVER | USA ON BEHALF OF NEZ PERCE TRIBE |
| 3 | 87-12000 | Reserved | Yes | n/a | 1160.00 | MINIMUM STREAM FLOW | PALOUSE RIVER | USA ON BEHALF OF NEZ PERCE TRIBE |
| 4 | 87-12001 | Reserved | Yes | n/a | 33.00 | MINIMUM STREAM FLOW | PARADISE CREEK | USA ON BEHALF OF NEZ PERCE TRIBE |
| 5 | 87-12002 | Reserved | Yes | n/a | 39.00 | MINIMUM STREAM FLOW | SF PALOUSE RIVER | USA ON BEHALF OF NEZ PERCE TRIBE |

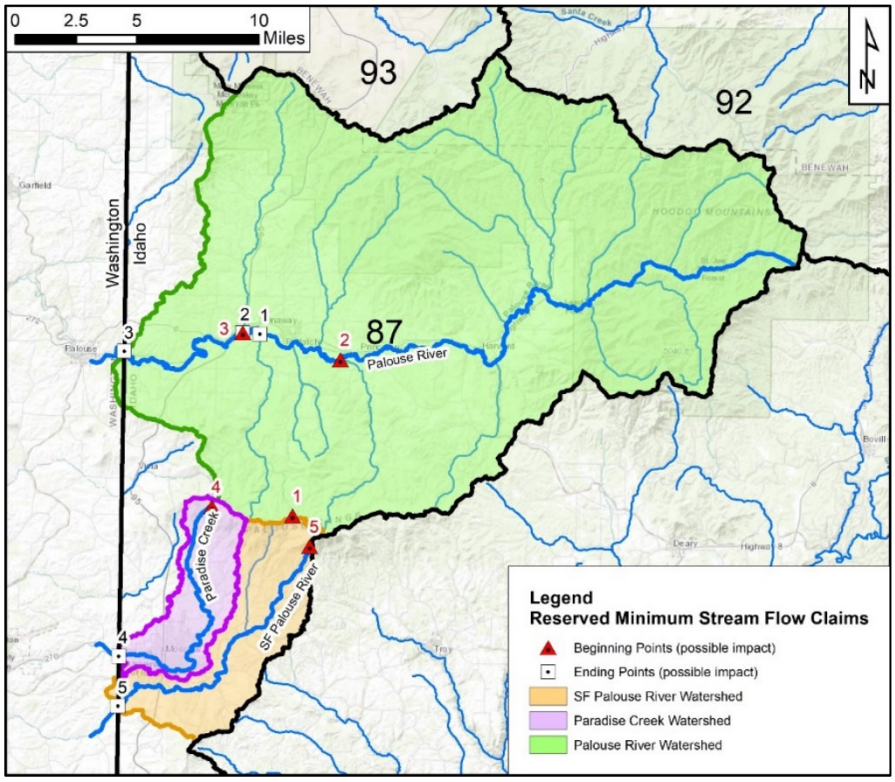



Figure 4. Location of Nez Perce Claims that have Potential to Influence PBAC's New Appropriations.

## G. Summary

Water rights for water supply alternatives that have diversions from streams within Idaho (Flannigan Creek, Paradise Creek, or South Fork Palouse River) can best be established through the appropriation process. This process consists of applying for a water right permit. If the permit is approved, water use can be developed within the limits of the permit over a period of up to 15 years. Following the permit development period, the water right can then be licensed (perfected) for the quantity developed.

Acquisition of existing water rights is not necessary nor recommended for the water supply alternatives. Existing water rights within the watersheds proposed for appropriation do not pose significant constraints on new appropriations and are unlikely to be necessary for mitigation purposes.

Nez Perce minimum streamflow claims that are pending in the PBA have the potential to be a significant constraint on PBAC water supply projects. Unless subordinated to new uses, these claims have the potential to significantly reduce water availability for projects with diversion points in Idaho. Monitoring of the claim negotiation process is recommended to determine the potential impacts.

July 21, 2021

Robin Nimmer, Ph.D., P.G., L.G.
Alta Science and Engineering, Inc.
220 E. Fifth Street, Suite 325
Moscow, ID 83843

**Re: Washington Water Right Review for Palouse Groundwater Basin Water Supply Alternatives (Project No. 20001)**

Dear Dr. Nimmer:

This report summarizes our findings for the Palouse Basin Aquifer Committee (PBAC) Palouse Groundwater Basin Alternative Water Supply project (Alternatives) in Water Resources Inventory Areas (WRIA) 34 and 35 in support of Alta Science and Engineering, Inc.'s (Alta) Alternative Water Supply Scope of Work. McCormick Water Strategies, LLC (MWS) reviewed regional geography, PBAC planning documents, and instream flow rules, and discussed options with Washington State Department of Ecology (Ecology) staff to identify opportunities and constraints for regional water supply development and water availability.

It is understood that this assessment seeks to broadly guide PBAC's water supply Alternatives development to meet a projected annual water supply goal of up to 7,130 acre-feet per year[1] to meet 50-year projected water demand increases and aquifer stabilization (Anchor, 2017). For the purposes of this report, acre-foot quantities were chosen to simplify and standardize the Washington water right review. Assessment of specific sites and water right permitting options will require further specific detailed analysis to determine actual water availability at each site.

## Findings

Based on the regional geography, PBAC planning documents, instream flow rules, and other key documents, MWS provides the following analysis of surface water availability in consideration of future Ecology water rights permitting for the purposes of Palouse Basin regional water supply development. Copies of maps and key documents are included with this report.

### *Water Supply Alternatives*

The March 2017 Palouse Groundwater Basin Water Supply Alternatives Analysis Report – Summary prepared for PBAC (Anchor, 2017) identified and ranked four water supply alternatives (regional and local) to meet annual water supply goals in Washington State and Idaho. PBAC's water supply alternatives are identified in Table 1 with design volumes estimated for diversion in Washington State. See the Anchor, 2017 report for maps and figures.

[1] Water supply goal includes appropriations from Washington State or Idaho, or both states, depending on the Alternative.

**Table 1: PBAC Water Supply Alternatives Summary and WRIAs**

| Alternative (WRIA) | Description | WA Design Volume (acre-feet) |
|---|---|---|
| 1 – Snake River (WRIA 35) | Diversion from Snake River in Washington State. Transmission facilities into both Washington and Idaho. | 6,040 |
| 2 – North Fork Palouse Diversion/Paradise Creek or South Fork Palouse Aquifer Recharge (WRIA 34) | Diversion from North Fork Palouse in Washington State. Transmission and recharge facilities in both Washington and Idaho. | 4,760 |
| 3 – Flannigan Creek Storage/South Fork Diversion (WRIA 34) | Separate diversions and transmission facilities in each state. | 2,743 |
| 4 – Paradise Creek Aquifer Recharge/South Fork ASR/Pullman Wastewater Reuse/Recharge/Additional Conservation (WRIA 34) | Separate diversions and transmission facilities in each state. | 997 |

This report seeks to provide qualified answers to the often complicated questions around water right appropriations and transactions related to the Alternatives, and identify areas of additional research and next steps. MWS was not asked to evaluate the legal or policy implications of diverting or conveying water interstate.

## *Washington State Water Right Administration*

All uses of waters of Washington State require following State Water Code and obtaining a water right, unless for a minor permit exempt groundwater use. All diversions of surface water in Washington State require a water right appropriation, especially appropriations in the order of magnitude of PBAC's water supply goal of just over 7,000 acre-feet. Water rights can generally either be appropriated or obtained through the three following routes (exceptions do exist):

1. Apply for a new water right appropriation.
2. Transfer or change an existing water right.
3. Mitigated new water right appropriation.

Each of the three routes above requires application of different statutes and various transactional costs (including capital costs for acquisition of existing water rights).

### Water Right Appropriation Process in Washington State

When applying for a new water right appropriation, under state law, water rights appropriation and permitting is administered by Ecology under Chapter 90.03 RCW for surface water and Chapter 90.44 RCW for groundwater. Generally speaking, a water right application is assigned a priority date based on the day the application was received, not when water is put to beneficial use. Also,

both surface and groundwater appropriation rely on the appropriation procedure, known as the Four-Part Test, as outlined and defined in Chapter 90.03 RCW, Hillis, 1997, and Kittitas, 2011, and the Prior Appropriation Doctrine.

The Four-Part Test is as follows:

1. That the use be for a beneficial purpose.
2. That the use be in the public interest.
3. That water be available for the appropriation (physical water availability).
4. That the proposed use not impair existing water rights (legal water availability).

Given that PBAC's proposed uses identified as alternatives (municipal and groundwater recharge) are likely to be well-documented beneficial uses, and that it is likely that said uses would be consistent with the public's interest, the remainder of this analysis will focus on the third and fourth parts of the test, *legal and physical water availability*. Legal water availability has been interpreted as to whether the water right has been previously allocated to another user(s), or whether it has been required to sustain instream resources (i.e. fish and wildlife). Physical water availability has been interpreted as a measure of whether water is available in sufficient quantities to satisfy the proposed use.

In addition to the Four-Part Test, Ecology follows the Prior Appropriation Doctrine, "first in time, first in right", when administering water rights based on the day the application was received. Ecology processes water right applications in order based on priority date and prior appropriation regardless of when the water right is to be put to beneficial use. Further, different permitting processes exist for new water right appropriations vs. water right changes and transfers.

Ecology's Hillis Rule (Hillis, 1997) is an example of certain conditions that must be met to process a water right application out of priority, given that there are likely senior pending applications on record, depending on the surface water source. For water right changes and transfers, a Water Conservancy Board or the Cost Reimbursement Process can be used to potentially process the application out of priority.

### *Summary of Source Water Regions*

The following is a summary of the surface water sources identified in the Palouse Groundwater Basin Water Supply Alternatives Report (Anchor, 2017). Generally, PBAC's regional water supply area is located within both the WRIA 34 – Palouse Basin and the WRIA 35 – Middle Snake Basin in Washington State. Water has previously been appropriated in all of these WRIAs and Subbasins.

Within WRIA 34, PBAC is positioned in three Subbasins: 1) North Fork Palouse River, 2) South Fork Palouse River, and 3) Paradise Creek. There are not Endangered Species Act (ESA) listed anadromous salmonids or Bull trout in the identified WRIA 34 Subbasins according to Washington State Department of Fish and Wildlife (WDFW) SalmonScape online database (WDFW, 2021).

In the WRIA 35, Middle Snake Basin, the region has experienced declining fisheries populations and ESA listings, which affects water availability. Additionally, Ecology adopted a Main Stem Snake River Instream Flow Rule that closed new consumptive appropriations in WRIA 35 from

1993 to 1999. There are multiple ESA listed anadromous salmonids and Bull trout in the Snake River, including WRIA 35, according to WDFW's SalmonScape online database (WDFW, 2021).

### Ecology Instream Flow Rules

PBAC's water supply alternative surface water sources are proposed to be sited in both WRIAs 34 and 35. An instream flow rule does not exist in WRIA 34, but there is an Instream Flow Rule in WRIA 35 that applies to Alternative 1, Snake River, Table 1.

In addition, water rights issued in the 1970's-1990's on the Snake River in WRIA 35 and the Lower Snake River upstream of Ice Harbor Dam included instream flow provisions for the Snake River measured immediately below the confluence of the Clearwater River at 13,300-13,800 cfs. The instream flow provisions are not codified in WAC, but necessary to satisfy the Four-Part Test to meet legal water availability.

### Main Stem Snake River Instream Flow Rule

Through the authority granted to Ecology by the State Legislature, Ecology adopted the instream flow rule for the Main Stem Snake River (Snake River), including WRIA 35, under Chapter 173-564 WAC (Attachment A.1) effective on January 03, 1993. The following points are summaries from the Snake River Instream Flow Rule concerning legal and physical water availability relevant to PBAC:

1. Alternative 1 is based on diversion of surface water from the Snake River in the Lower Granite Dam Pool.
2. WAC 173-564-040 enacted a "Withdrawal of unappropriated waters" commencing on water right applications accepted on or after December 20, 1991, with an expiration date of July 01, 1999.
3. While WAC Section 173-564-040 expired on July 01, 1999, the remainder of the WAC remains in effect concerning "Background and purpose", WAC 173-564-010, "Authority", WAC 173-564-020, and "Applicability", WAC 173-564-030. None of these sections compel Ecology to limit appropriations or withdrawal unappropriated waters, but they do maintain the applicable area and shared authority with the United States of America.

### Snake River Instream Flow Provisions

Review of water right records with surface water sources in the Snake River and upstream of Ice Harbor Dam revealed that water right appropriations in the Snake River after approximately 1974 included an interruptible instream flow provision measured immediately below (downstream of) the confluence of the Snake and Clearwater Rivers. MWS appended two example appropriations to this report in Attachment A.2. In reviewing one of the subject water right file records, it was revealed that the instream flow provision was based on an Ecology adopted Snake River Water Rights Policy dated May 07, 1974.

Records indicate that this policy set aside 2,000 cubic feet per second (cfs) for appropriations with a sliding scale instream flow provision based on allocation. The sliding scale instream flow provision explains why the two appropriations have different interruptible flows. The interruptible flows for the two appropriations range from 13,300-13,800 cfs in the Snake River measured immediately below the confluence of the Clearwater River.

## *Review of Existing Water Rights*

MWS performed a brief review of existing water rights in the North Fork Palouse River, South Fork Palouse River, and Paradise Creek consistent with Alternatives 2-4, Table 1, in Washington State[2]. Review of water rights in these basins focused on certificated surface water rights. Due to the uncertain nature of claims, surface water claims and all groundwater rights were omitted (claims, certificates, etc.) due to PBAC's focus on surface water sources for the Alternatives, Table 1.

MWS accessed Ecology's Geographic Water Right Information System (GWIS) geodatabase export from May 03, 2021. Ecology's GWIS database is a dynamic geospatial water right database that is subject to change by Ecology. MWS filtered water right GWIS records based on location in the Palouse Basin, and further refined the dataset based on the following criteria:

1. Located in North Fork Palouse River, South Fork Palouse River, and Paradise Creek.
2. Surface water right.
3. All surface water right documents, except for claims.

MWS exported a refined list from Ecology's extract of the Water Right Tracking System database, known as the Water Right Document table. Errors can exist in the Water Right Document table, and this project scope did not provide for effort to evaluate each record. Additionally, review of Snake River water rights is a significant effort (i.e., thousands of water rights, numerous tributaries, and groundwater in hydraulic continuity) and is well beyond the scope of this water right review project.

### Existing Water Rights Considerations

Existing water rights present opportunity for acquisition into a water right portfolio. On the other hand, when permitting new water right appropriations, Ecology must consider existing water rights when assessing legal and physical availability during permitting. In total, PBAC is seeking to meet a water supply goal of up to 7,130 acre-feet per year[3], and the following analysis provides insight into existing surface water appropriations.

### North Fork Palouse River

Paper surface water right certificate records for the North Fork Palouse River indicate a total instantaneous quantity (Qi) of 5.57 cubic feet per second (cfs), an annual quantity (Qa) of 1,022 acre-feet/year, and 441 irrigated acres appropriated, Attachment A.3. Purposes of use include irrigation, domestic, and stockwater with priority dates ranging from 1950 to 1974. Geographic distribution of points of diversion are represented in Figure A.1.

[2] Headwaters of all three basins physically extend into Idaho. See PBAC's companion Idaho water right report for Idaho appropriations and water availability.
[3] Water supply goal includes appropriations from Washington State or Idaho, or both states, depending on the Alternative.

### South Fork Palouse River and Paradise Creek

Paper surface water right certificate records for the South Fork Palouse River indicate a total Qi of 8.047 cfs, a Qa of 360.56 acre-feet/year, and 347 irrigated acres appropriated, Attachment A.4. Purposes of use include irrigation, domestic, recreation, environmental quality, commercial, industrial, wildlife, and stockwater with priority dates ranging from 1946 to 2000. Geographic distribution of points of diversion are represented in Figure A.2.

Paper surface water right certificate records for Paradise Creek indicate a total Qi of 3.25 cfs, a Qa of 19.6 acre-feet/year, and 5 irrigated acres appropriated, Attachment A.4. Purposes of use include irrigation, domestic, and environmental quality with priority dates ranging from 1947 to 1987. Geographic distribution of points of diversion are represented in Figure A.2.

Note: One Paradise Creek water right record stands out as a possible discrepancy. The Qi is 2.92 cfs with a Qa of 16 acre-feet/year. At the allocated Qi, the Qa would be exceeded in a few days.

In total, paper surface water right certificate records for the South Fork Palouse River and Paradise Creek indicate a total Qi of 11.297 cfs, a Qa of 380.16 acre-feet/year, and 352 irrigated acres appropriated, Attachment A.4

## *Water Market Conditions*

Generally speaking, surface water rights are being transacted on a wholesale basis in the greater Washington State portion of the Columbia Basin in the range of $3,000-$10,000/acre-foot consumptive use following extent and validity evaluation from Ecology. Typically, water rights are purchased based on the acre-foot consumptive use (i.e., water consumed by plants or evaporated), which tends to be less than appropriated water right/water duty (acre-feet/acre). Additionally, water rights are generally purchased following Ecology's regulatory review to minimize transactional risk.

MWS is aware of one Washington State groundwater right sale and transfer in the Palouse Basin from properties near Pullman, Washington to a property near the state border in 2008. Public records from the water transfer indicate that 45 acre-feet from two parties were transacted in 2008 at a rate of $1,170/acre-foot (not a consumptive transfer). MWS is not aware of a recent surface water right transaction in the Palouse Basin, and groundwater transactions are typically not comparable to surface water transactions primarily due to limitations with changes in groundwater sources (same body of groundwater) and limitations in the source places on market size.

Discussion with Ecology did not reveal any known additional surface or groundwater transactions in the Palouse Basin or on the Snake River in the Lower Granite Dam pool.

### *Washington State Department of Ecology Scoping Conference Call*

MWS, Alta, PBAC Members, and Ecology held a conference call focused on scoping water right permitting and water availability on June 07, 2021. A complete summary of the conference call is appended to this report as Attachment A.5. In summary, MWS and Alta identified and placed questions to Ecology into four categories. Those four categories include:

1. Alternatives/Regional Water Supply Planning
2. Regulatory/Water Right Administration
3. Water Market and Reliability
4. Office of Columbia River and Regional Priorities

Key takeaways from the meeting included:

- Ecology indicated that they are unable to offer specific regulatory guidance until PBAC has: 1) a more solidified proposal, and 2) an administrative request to Ecology.
- Ecology also recognizes the challenges and complexities of bi-state or interstate management of water resources. However, Ecology is working on bi-state water resource management in the Walla Walla Basin through the Tri-Sovereign group (Washington, Oregon, and Umatilla Tribe). Ecology recommends tracking progress in the Walla Walla Basin.
- Washington State and the State of Idaho are not acting as co-managers on Snake River water resources.
- Ecology indicated that new appropriations from the Snake River may be more challenging than the Palouse Basin, and that upstream transfers on the Snake River from the Lower Snake River are likely to face challenges.
- While evaluating the Alternatives, Ecology suggested that PBAC would be well advised to further evaluate fisheries, in consultation with fishery managers, in both the Palouse and Snake River Basins.
- Ecology had no comment on the notion of a downstream transfer on the Snake or Clearwater Rivers from Idaho to Washington State.

### *Order of Magnitude Costs Estimates*

MWS was requested to perform a high-level scoping order of magnitude cost estimate on the Alternatives as related to obtaining a water right. This estimate is provided based on a standardized approach to water right permitting and the level of complexity known at this time.

**Assumptions:**

- No mitigation required for new appropriations.
- Minimal ESA consultation or fisheries evaluation and consultation.
- No on-the-ground flow measurement or monitoring for sources without flow measurement.
- Water rights are available for purchase and willing sellers exist at the desired source and in the annual amount requested.
- Acquisition of water only considers the cost of water, not the water right administrative costs of change or transfer, or the transactional costs of negotiating or obtaining water rights from willing sellers.
- One source of supply and one state involvement.
- One water right application for new appropriations.
- Legal and policy implications of interstate water conveyance is clarified and legislation is implemented.
- Transactional risk (i.e., denial, appeal, etc.) is not factored into this analysis.

#### Cost Estimates

The following cost estimates apply to Alternatives 1-4, Table 1.

#### Water Acquisition

Water acquisition is assumed to consider the base cost of water for each Alternative at two levels: 1) $3,000/acre-foot consumptive use (CU), and 2) $5,000/acre-foot CU. Order of magnitude water acquisition costs are summarized in Table 2.

**Table 2: Water Acquisition Cost Estimate**

| Alternative (WA State) | Water Supply Goal (acre-feet/year) | Wholesale Cost ($/acre-foot CU) | Total Acquisition Cost |
|---|---|---|---|
| 1 – Snake River Diversion | 6,040 | $3,000 | **$18,120,000** |
| | 6,040 | $5,000 | **$30,200,000** |
| 2 – North Fork Palouse Diversion | 4,760 | $3,000 | **$14,280,000** |
| | 4,760 | $5,000 | **$23,800,000** |
| 3 – South Fork Palouse Diversion | 2,743 | $3,000 | **$8,229,000** |
| | 2,743 | $5,000 | **$13,715,000** |
| 4 – Paradise Creek /South Fork Div. | 997 | $3,000 | **$2,991,000** |
| | 997 | $5,000 | **$4,985,000** |

### Water Right Appropriation

A simplified water right appropriation cost estimate is provided based on professionally accepted best practices and standardized water right permitting practices and comparable work in the region for the purposes of scoping level feasibility. Water availability research cost estimate is based on what is known about legal and physical water availability at this point. The water availability cost item was included to address unknowns around fish and aquatic resources and surface water source hydraulic capacity and reliability. Order of magnitude water appropriation costs are summarized in Table 3.

**Table 3: Simplified Water Right Appropriation Cost Estimate**

| Appropriation Item | Cost | Cost/acre-foot | |
|---|---|---|---|
| | | 6,040 acre-feet | 997 acre-feet |
| Application and Notice | **$5,000** | - | - |
| Water Availability Research | **$55,000** | - | - |
| Report of Examination | **$40,000** | - | - |
| Total | **$100,000** | **$17** | **$100** |

Considering a project with this scale and complexity, it is anticipated that water right appropriation cost estimates will rise. The level of cost increase is dependent upon the complexity of the source and the level of effort required to define and negotiate legal and physical water availability. In summary, the simplified water right appropriation cost estimate results in a minimum cost per unit of $17/acre-foot. As stated above, this estimate is very likely to increase as more becomes known about surface water source legal and physical water availability.

### Order of Magnitude Summary

PBAC's water supply goal of 6,040 acre-feet/year from the Snake River results in a water acquisition cost of approximately $18.1-$30.2 million at water acquisition rates from $3,000-$5,000/acre-foot CU. Conversely, water right appropriation of 6,040 acre-feet is preliminarily estimated at $100,000 or approximately $17/acre-foot. Therefore, water acquisition is estimated to be a greater cost than water right appropriation.

## Conclusions

The following is concluded upon evaluation of Alternatives 1-4, Instream Flow Rules, Existing Water Rights, and communication with Ecology:

1. PBAC's water supply Alternatives require an appropriated water right from Washington State, the State of Idaho, or both states. In Washington State, general permitting options are as follows:
    a. Water right acquisition(s) and change or transfer.
    b. Permitting of legal and physically available water supplies (i.e., new appropriation).
    c. Mitigated permitted water supplies as a hybrid permitting option.
2. It is concluded that PBAC's water supply goals exceeds existing surface water rights (excluding claims), on paper, in the following Subbasins:
    a. North Fork Palouse River with a Qa 1,022 acre-feet/year. Alternative 2 goal (4,760 acre-feet) exceeds Qa by 3,738 acre-feet/year.
    b. South Fork Palouse River and Paradise Creek with a Qa of 380.16 acre-feet/year. Alternative 3 goal (2,743 acre-feet) exceeds Qa by 2,362.84 acre-feet/year.
    c. South Fork Palouse River and Paradise Creek with a Qa of 380.16 acre-feet/year. Alternative 4 goal (997 acre-feet) exceeds Qa by 616.84 acre-feet/year.
3. Based on guidance from Ecology, it is concluded that seeking new appropriations from the Palouse Basin may be a less difficult task than seeking new appropriations from the Snake River or upstream transfers of acquired water rights. General permitting options qualitatively ranked from least difficult to more difficult are as follows:
    a. New appropriations in the Palouse Basin, Alternatives 2-4.
    b. New appropriations from the Snake River, Alternative 1.
    c. Water right transfers of acquired water rights from areas in the Palouse Basin, Alternatives 2-4.
    d. Water right transfers of acquired water rights in the Snake River from areas upstream of Lower Granite Dam, Alternative 1.
    e. Water right transfers on the Snake River from areas below Lower Granite Dam, Alternative 1.
4. It is concluded that identifying and quantifying aquatic resources and requirements as it relates to legal and physical water availability in either, or both, the Palouse Basin and Snake River is critical to identifying available water supplies. Developing an intimate understanding of aquatic resources requirements is concluded to be a prerequisite to quantifying water availability for all Alternatives.
5. It is concluded that it is not feasible to meet PBAC's water supply goal with water acquisition from existing surface water right quantities under Alternatives 2-4. Evaluation of existing Snake River surface water rights and assessment of water acquisition feasibility for Alternative 1 were beyond the scope of this report.

6. It is concluded that a new water right appropriation has a high likelihood of resulting in an order of magnitude cost significantly less than acquiring existing water rights.

## Recommendations

The following is recommended upon evaluation of the Alternatives, Instream Flow Rules, Existing Water Rights, and communication with Ecology:

1. It is recommended that if PBAC is to acquire existing water rights for direct water right change/transfer or for mitigation in the near-term, that a water supply Alternative is selected, and the surface water source is identified.
2. It is recommended that PBAC focus their vision, planning, and development of source water supply options on areas where there is: (1) legal and physical water availability for new appropriations, and (2) limited to no impacts on ESA listed species and/or aquatic resources.

## Limitations

Work for this project was performed for Alta Science and Engineering, Inc. (Client), and this report was prepared in accordance with generally accepted professional practices for the nature and conditions of work completed in the same or similar localities, at the time the work was performed. This report does not represent a legal opinion. No other warranty, express or implied, is made.

All reports prepared by McCormick Water Strategies (MWS) for the Client apply only to the services described in the Agreement(s) with the Client. Any use or reuse by any party other than the Client is at the sole risk of that party and without liability to MWS. MWS's original files/reports shall govern in the event of any dispute regarding the content of electronic documents furnished to others.

Sincerely,

MCCORMICK WATER STRATEGIES, LLC

**Jason D. McCormick, CWRE**
Principal
jason@mccormickwater.com

**Figures:**
Figure A.1 – North Fork Palouse River Water Right Points
Figure A.2 – South Fork Palouse River and Paradise Creek Water Right Points

**Attachments:**
Attachment A.1 – Chapter 173-564
Attachment A.2 – Snake/Clearwater River Permit Examples
Attachment A.3 – North Fork Palouse Surface Water Rights
Attachment A.4 – South Fork Palouse and Paradise Creek Surface Water Rights
Attachment A.5 – Alta Science and Engineering Meeting Summary

**References:**

Anchor QEA, LLC, et al. Palouse Groundwater Basin Water Supply Alternatives Analysis Report. Prepared for the Palouse Basin Aquifer Committee. March 2017.

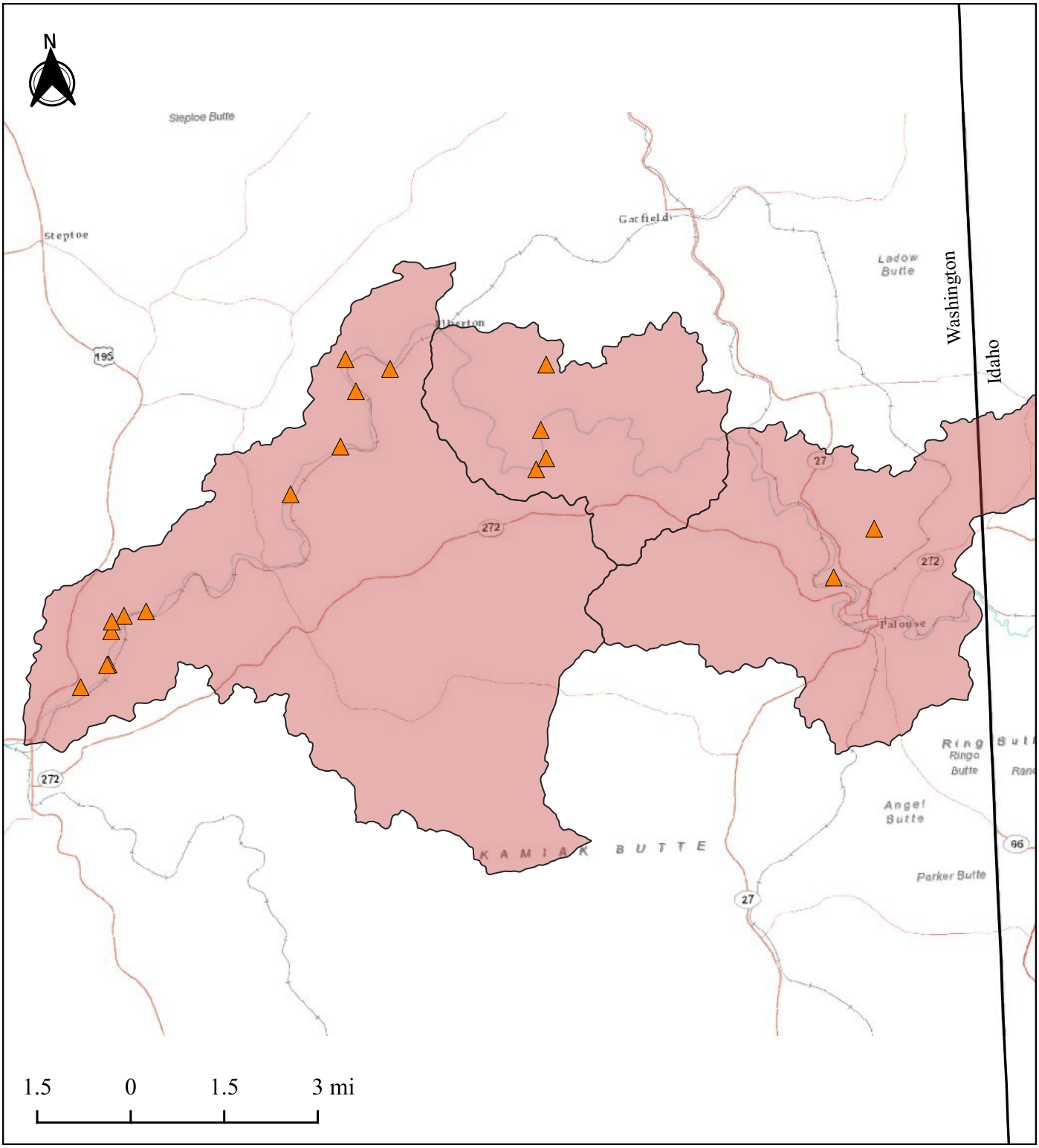
Hillis v. Department of Ecology, 131 Wn.2d 373, 932 P.2d 139. 1997.

Kittitas County, et al. vs. Eastern Washington Growth Management Hearings Board, et al. 172 Wash.2d 144, 256 P.3d 1193. 2011.

Washington State Department of Ecology. Geographic Water Right Information System. <https://appswr.ecology.wa.gov/waterresources/map/GISdataInfo.aspx>. Accessed on May 03, 2021.

Washington State Department of Fish and Wildlife (WDFW). SalmonScape. <http://apps.wdfw.wa.gov/salmonscape/map.html>. Accessed on May 03, 2021.

**Figure A.1 – North Fork Palouse River Water Right Points**




**Palouse Basin Aquifer Committee (PBAC)**
**Figure A.1 - NF Palouse River Water Right Points**

Prepared for: Alta Science and Engineering, Inc.

July 21, 2021

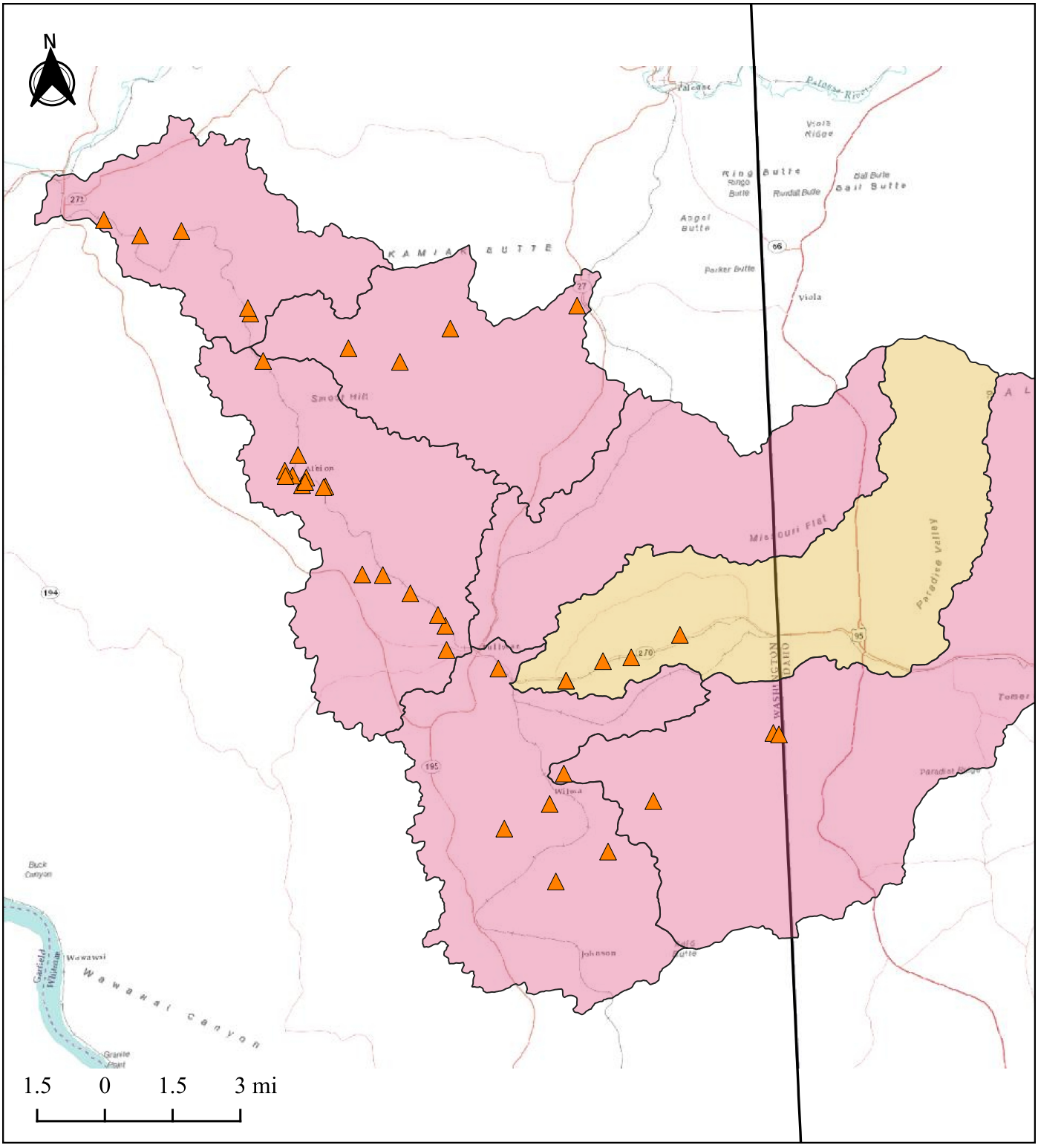
Image Source: ESRI Reference Overlay.

Project No. 20001

Surface Points of Diversion

- Diversion/Headworks
- North Fork Palouse HUC12

**Figure A.2 – South Fork Palouse River and Paradise Creek Water Right Points**




**Palouse Basin Aquifer Committee (PBAC)**
**Figure A.2 - SF Palouse River and Paradise Creek Water Right Points**

Prepared for: Alta Science and Engineering, Inc.

July 21, 2021

Image Source: ESRI Reference Overlay.

Project No. 20001

Surface Points of Diversion

- Diversion/Headworks
- South Fork Palouse HUC12
- Paradise Creek HUC12

**Attachment A.1 – Chapter 173-564**

# Chapter 173-564 WAC
# WATER RESOURCES MANAGEMENT PROGRAM FOR THE MAIN STEM OF THE SNAKE RIVER IN WASHINGTON STATE

**Last Update:** 1/3/95

**WAC**



**WAC 173-564-010 Background and purpose.** The Snake River is an interstate river with waters subject to laws of five states and the federal government. The flows and levels of the river in Washington state are heavily influenced by the operation of federally owned and federally licensed dams located upstream from Washington and within Washington, as well as by water diversions in the various states. The waters of the river support extensive irrigation, navigation, municipal, industrial, and power generation uses as well as nationally significant anadromous fish runs. These fish runs require for their survival clean, flowing water assured by minimum flows and special actions by all agencies sharing in the management of the river.

The department of ecology of the state of Washington recognizes that, under our federal constitutional system, regulatory power over the Snake River is shared between the United States and the states and that by various federal actions the state's powers may in some cases be superseded through the mandates of the Supremacy Clause of the United States Constitution.

This chapter is adopted to promote the proper utilization of the water resources of the Snake River and to protect and insure the viability of the instream resource values associated with the main stem of the river in the future.

[Statutory Authority: Chapters 34.05, 43.21A, 43.27A, 90.03, 90.44 and 90.54 RCW and Chapter 173-500 WAC. WSR 93-01-010 (Order 92-21), § 173-564-010, filed 12/3/92, effective 1/3/93.]

**WAC 173-564-020 Authority.** These rules are adopted under the authority of chapters 34.05, 43.21A, 43.27A, 90.03, 90.44, and 90.54 RCW, and in relation to chapter 173-500 WAC.

[Statutory Authority: Chapters 34.05, 43.21A, 43.27A, 90.03, 90.44 and 90.54 RCW and Chapter 173-500 WAC. WSR 93-01-010 (Order 92-21), § 173-564-020, filed 12/3/92, effective 1/3/93.]

**WAC 173-564-030 Applicability.** (1) This chapter applies to public surface waters of the main stem of the Snake River in Washington and to any groundwater where the groundwater is determined by the department of ecology to be part of or tributary to the surface waters of the main stem of the Snake River. For purposes of this chapter, the main stem of the Snake River extends from the Idaho, Oregon and Washington border, in the extreme southeastern corner of the state of Washington, at river mile 175, to the confluence with the Columbia River near Pasco, Washington at river mile 0.

(2) Nothing in this chapter shall affect existing water rights, riparian, appropriative, or otherwise, existing on the effective date

of this chapter, including existing water right permits and certificates.

[Statutory Authority: Chapters 34.05, 43.21A, 43.27A, 90.03, 90.44 and 90.54 RCW and Chapter 173-500 WAC. WSR 93-01-010 (Order 92-21), § 173-564-030, filed 12/3/92, effective 1/3/93.]

**WAC 173-564-040 Withdrawal of unappropriated waters.** (1) The National Marine Fisheries Service (NMFS) listed Snake River sockeye salmon as endangered under the federal Endangered Species Act on December 20, 1991. NMFS listed Snake River spring/summer and fall chinook salmon as threatened under the act on May 17, 1992. Since then, new information and changing conditions continue to place into question whether sufficient information and data is available for making sound decisions on water availability and the public interest for additional appropriations from the main stem of the Snake River. In response to the petitions for listing, the Northwest governors directed the regional Northwest Power Planning Council to develop a plan for the recovery of the petitioned species and other weak fish stocks in the Columbia Basin, including the Snake River. In late 1992 the council finalized its strategy for salmon, which cautioned the states against continuing to allow new appropriations at the same time that there is a regional effort to acquire additional flows for imperiled fish stocks. This regional effort has greatly intensified as a result of additional petitions for Endangered Species Act listings in the basin, consecutive dry years and a 1994 federal court decision that the hydroelectric system operations plan approved by NMFS and the federal operating agencies was not adequate.

(2) Pursuant to subsection (1) of this section, the waters of the main stem of the Snake River that are unappropriated by water rights for which applications were accepted for filing by the department prior to December 20, 1991, are withdrawn from further appropriation, except that the department may issue a permit to withdraw water for:

(a) Nonrecurring temporary projects for up to six months duration, with a possible extension of no more than six additional months (applications for extensions must include adequate justification for the extension and must demonstrate that reasonable efforts are being made to use the water for the project as efficiently as possible);

(b) Nonconsumptive uses which, for the purposes of this section, are defined as uses where:

(i) There is no diversion from the water source; or

(ii) The water is diverted and returned immediately to the source at the point of diversion following its use, in the same quantity as diverted and with no degradation in water quality;

(c) Uses which are necessary for emergency public health and safety needs, when all other reasonable methods of obtaining water (e.g., conservation, efficiencies, etc.) have been exhausted; and

(d) Uses which are specifically intended to benefit weak fish stocks.

(3) All water right applications which the department accepted for filing prior to December 20, 1991, for diversion or pumping of surface water from the main stem of the Snake River, or for withdrawal of groundwater which is part of the main stem of the Snake River, shall be processed in accordance with existing policies and procedures and are not subject to this withdrawal of waters.

(4) With the exceptions specified in subsection (2) of this section, all water right applications which the department accepted or accepts for filing on or after December 20, 1991, which would result in the diversion or pumping of surface water from the main stem of the Snake River, regardless of the point of diversion specified in the water right application, are subject to this withdrawal of waters. These applications will be acted upon, without loss of priority date, after the expiration of the withdrawal of waters.

(5) With the exceptions specified in subsection (2) of this section, all water right applications which the department accepted or accepts for filing on or after December 20, 1991, which require a permit under RCW 90.44.050 and would result in the withdrawal of groundwater which is in direct hydraulic continuity with the main stem of the Snake River are subject to this withdrawal of waters. All applications will be evaluated on a case-by-case basis. Applications determined to be subject to the withdrawal will be acted upon, without loss of priority date, after the expiration of the withdrawal of waters.

(6) This section will expire on July 1, 1999, or upon adoption by the department of ecology of a new instream resources protection program for the main stem Snake River, whichever shall occur first. The instream resources protection program shall be established in accordance with chapter 173-500 WAC (Water resources management program).

[Statutory Authority: Chapter 173-500 WAC, chapters 34.05, 43.21A, 43.27A, 90.03, 90.44 and 90.54 RCW. WSR 95-02-066 (Order 94-18), § 173-564-040, filed 1/3/95, effective 2/3/95; WSR 93-01-010 (Order 92-21), § 173-564-040, filed 12/3/92, effective 1/3/93.]

**Attachment A.2 – Snake/Clearwater River Permit Examples**

STATE OF WASHINGTON
**DEPARTMENT OF ECOLOGY**

# *PERMIT*

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

[X] Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

[ ] Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

| PRIORITY DATE | APPLICATION NUMBER | PERMIT NUMBER | CERTIFICATE NUMBER |
|---|---|---|---|
| April 22, 1991 | [redacted] | [redacted] | |

NAME
[redacted]

| ADDRESS (STREET) | (CITY) | (STATE) | (ZIP CODE) |
|---|---|---|---|
| [redacted] | [redacted] | [redacted] | [redacted] |

*The applicant is, pursuant to the Report of Examination which has been accepted by the applicant, hereby granted a permit to appropriate the following described public waters of the State of Washington, subject to existing rights and to the limitations and provisions set out herein.*

## PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Snake River (above Ice Harbor Dam)

TRIBUTARY OF (IF SURFACE WATERS)
Columbia River

| MAXIMUM CUBIC FEET PER SECOND | MAXIMUM GALLONS PER MINUTE | MAXIMUM ACRE-FEET PER YEAR |
|---|---|---|
| 3.4 | | 733 (supplemental) |

QUANTITY, TYPE OF USE, PERIOD OF USE
3.4 cubic feet per second, 733 acre feet per year, from January 1 to December 31, each year, for the supplemental seasonal irrigation of 450 acres and heat and frost control.

## LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION--WITHDRAWAL
[redacted]

| LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) | SECTION | TOWNSHIP N. | RANGE, (E. OR W.) W.M. | W.R.I.A. | COUNTY |
|---|---|---|---|---|---|
| [redacted] | 19 | 12 | 34 E | 33 | Walla Walla |

## RECORDED PLATTED PROPERTY

| LOT | BLOCK | OF (GIVE NAME OF PLAT OR ADDITION) |
|---|---|---|
| | | |

## LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

[redacted]

## DESCRIPTION OF PROPOSED WORKS

Pump, pipeline, sprinklers

## DEVELOPMENT SCHEDULE

| BEGIN PROJECT BY THIS DATE: | COMPLETE PROJECT BY THIS DATE: | WATER PUT TO FULL USE BY THIS DATE: |
|---|---|---|
| Started | August 1, 1995 | August 1, 1996 |

## PROVISIONS

All diversion shall cease when the flow of the Snake River immediately below its confluence with the Clearwater River falls to 13,800 cubic feet per second. Future regulation against this flow will take into consideration the cancellation or relinquishment of permits or certificates issued based upon this low flow. Low flows of existing users will be revised correspondingly.

The total annual quantities of water appropriated and used upon these 450 acres under all rights shall not exceed 2092 acre feet per year for irrigation and heat and frost control.

The permittee is advised that at a diversion rate of 3.4 cubic feet per second (1530 gallons per minute), the maximum authorized annual quantity of 733 acre feet will be met in 108 days.

The amount of water granted is a maximum limit that shall not be exceeded and the water user shall be entitled only to that amount of water within the specified limit that is beneficially used and required for the actual crop grown on the number of acres and the place of use specified.

This authorization to make use of public waters of the state is subject to existing rights, including any existing rights held by the United States for the benefit of Indians under treaty or otherwise.

A certificate of water right will not be issued until a final examination is made.

This permit shall be issued subject to Washington Departments of Fisheries and Wildlife screening criteria as outlined in a Hydraulic Project Approval. Please contact the Department of Fisheries, 115 General Administration Building, AX-11, Olympia, WA 98504, Attention: Habitat Management Division, Phone (206) 753-6600; or the Department of Wildlife, 600 Capitol Way North, Mail Stop GJ-11, Olympia, Washington 98501-1091, Attention: Habitat Management Division, Phone (206) 753-3318, to obtain specific requirements for your project.

No dam shall be constructed in connection with this diversion.

*This permit shall be subject to cancellation should the permittee fail to comply with the above development schedule and/or fail to give notice to the Department of Ecology on forms provided by that Department documenting such compliance.*

*Given under my hand and the seal of this office at Spokane, Washington,*

[redacted]

Department of Ecology

by Theodore M. Olson

THEODORE M. OLSON, P.E., Section Supervisor
Water Resources Program

ENGINEERING DATA
OK CAC

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

THIS PERMIT SUPERSEDES SURFACE WATER PERMIT [redacted] ISSUED [redacted]

# PERMIT

## TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

[X] Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

[ ] Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

| PRIORITY DATE | APPLICATION NUMBER | PERMIT NUMBER | CERTIFICATE NUMBER |
|---|---|---|---|
| December 19, 1974 | [redacted] | [redacted] | |

NAME [redacted]

ADDRESS (STREET) [redacted] (CITY) [redacted] (STATE) [redacted] (ZIP CODE) [redacted]

*The applicant is, pursuant to the Report of Examination which has been accepted by the applicant, hereby granted a permit to appropriate the following described public waters of the State of Washington, subject to existing rights and to the limitations and provisions set out herein.*

### PUBLIC WATER TO BE APPROPRIATED

SOURCE
Snake River

TRIBUTARY OF (IF SURFACE WATERS)
Columbia River

| MAXIMUM CUBIC FEET PER SECOND | MAXIMUM GALLONS PER MINUTE | MAXIMUM ACRE-FEET PER YEAR |
|---|---|---|
| 40.0 | | 9059 |

QUANTITY, TYPE OF USE, PERIOD OF USE
40.0 cubic feet per second, 9059 acre feet per year, from January 1 to December 31, each year, for the irrigation of 1948 acres.

### LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION [redacted]

| LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) | SECTION | TOWNSHIP N. | RANGE, E. OR W.) W.M. | W.R.I.A. | COUNTY |
|---|---|---|---|---|---|
| [redacted] | 36 | 10 | 32 E | 33 | Walla Walla |

### RECORDED PLATTED PROPERTY

| LOT | BLOCK | OF (GIVE NAME OF PLAT OR ADDITION) |
|---|---|---|
| | | |

### LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

[redacted]

## DESCRIPTION OF PROPOSED WORKS

Pumping plant with mainlines and laterals.

## DEVELOPMENT SCHEDULE

| BEGIN PROJECT BY THIS DATE: | COMPLETE PROJECT BY THIS DATE: | WATER PUT TO FULL USE BY THIS DATE: |
|---|---|---|
| Started | October 1, 1989 | October 1, 1990 |

## PROVISIONS

Nothing in this permit shall be construed as excusing the permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations including those administered by local agencies under the Shoreline Management Act of 1971.

This authorization to make use of public waters of the state is subject to existing rights, including any existing rights held by the United States for the benefit of Indians under treaty or otherwise.

All diversion shall cease when the flow of the Snake River, immediately below its confluence with the Clearwater River, falls to 13,300 cubic feet per second.

Allocation of waters among potential uses and users shall be based generally on the securing of maximum net benefits for the people of the state. Maximum net benefits shall constitute total benefits, less costs, including opportunities lost.

Permittee shall cooperate with all public agencies in developing programs that provide for reasonable use of these lands to secure the maximum net benefits for the public. Such plan may include controlled and regulated access to these lands by the public.

In the case of fish and wildlife benefits, the permittee shall develop a wildlife conservation and management plan. The plan shall include evaluation of existing conditions and planned preservation of unique or endangered animals and plant species. The plan shall be submitted to the department for review within six (6) months from the date of permit issuance. The issuance of a Water Right Certificate shall be withheld until such time as the applicant has complied with all of the provisions of this permit.

The entire opening of the diversion intake shall be tightly screened at all times with wire mesh having openings with dimensions not greater than 0.125 (1/8) inch. Water approach velocity to the screen shall be less than 1 foot per second and approaching 0.5 foot per second, as measured one foot in front of the screen.

A suitable measuring device approved by the Department of Ecology shall be installed and maintained in accordance with RCW 90.03.360.

A certificate of water right will not be issued until a final examination is made.

*This permit shall be subject to cancellation should the permittee fail to comply with the above development schedule and/or fail to give notice to the Department of Ecology on forms provided by that Department documenting such compliance.*

*Given under my hand and the seal of this office at* Spokane *Washington,* [redacted]

[redacted]

CHRISTINE O. GREGOIRE, Director
Department of Ecology

ENGINEERING DATA
OK.....

by .....
THEODORE M. OLSON, P.E., Section Supervisor
Water Resource Program

**Attachment A.3 – North Fork Palouse Surface Water Rights**

| WR DOC ID | Source | Water Right No. | Priority Date | Document | Qi | Qa | Acres | Qi Rate | Purpose |
|---|---|---|---|---|---|---|---|---|---|
| 2136456 | Surface Water | S3-*09424C | 2/23/1950 | Certificate | 0.84 | 0 | 50 | CFS | IR |
| 2136468 | Surface Water | S3-*09521CWRIS | 4/12/1950 | Certificate | 0.5 | 0 | 33 | CFS | IR |
| 2136477 | Surface Water | S3-*09597CWRIS | 5/11/1950 | Certificate | 0.5 | 140 | 35 | CFS | IR |
| 2136325 | Surface Water | S3-*10902CWRIS | 12/3/1951 | Certificate | 0.47 | 140 | 35 | CFS | DS IR |
| 2135825 | Surface Water | S3-*13571ALCWRIS | 8/26/1955 | Certificate | 0.72 | 184 | 46 | CFS | IR |
| 2135845 | Surface Water | S3-*13716CWRIS | 1/27/1956 | Certificate | 0.31 | 80 | 20 | CFS | IR |
| 2135904 | Surface Water | S3-*14178CWRIS | 1/3/1957 | Certificate | 0.3 | 60 | 20 | CFS | IR |
| 2135606 | Surface Water | S3-*17509CWRIS | 9/11/1962 | Certificate | 0.41 | 100 | 25 | CFS | IR |
| 2135405 | Surface Water | S3-*18670CWRIS | 8/14/1964 | Certificate | 0.36 | 128 | 60 | CFS | IR |
| 2135305 | Surface Water | S3-*19948CWRIS | 10/25/1966 | Certificate | 0.62 | 112 | 80 | CFS | IR |
| 2135073 | Surface Water | S3-*20360CWRIS | 7/5/1967 | Certificate | 0.46 | 70 | 35 | CFS | IR |
| 2134928 | Surface Water | S3-*21752CWRIS | 8/4/1969 | Certificate | 0.01 | 2 | 0 | CFS | DS ST |
| 2131383 | Surface Water | S3-23877CWRIS | 10/25/1974 | Certificate | 0.02 | 1 | 0 | CFS | ST |
| 2131191 | Surface Water | S3-24155CWRIS | 11/21/1974 | Certificate | 0.05 | 5 | 2 | CFS | IR |
| ***Totals*** | | | | | ***5.57*** | ***1022*** | ***441*** | ***CFS*** | |

**Attachment A.4 – South Fork Palouse and Paradise Creek Surface Water Rights**

| WR DOC ID | Source | Water Right No. | Priority Date | Document | Qi | Qa | Acres | Qi Rate | Purpose |
|---|---|---|---|---|---|---|---|---|---|
| **South Fork Palouse River** | | | | | | | | | |
| 2136818 | Surface Water | S3-*06994CWRIS | 3/22/1946 | Certificate | 0.45 | 0 | 40 | CFS | IR |
| 2136389 | Surface Water | S3-*08947CWRIS | 7/30/1949 | Certificate | 0.11 | 0 | 8 | CFS | IR |
| 2136403 | Surface Water | S3-*09129CWRIS | 9/30/1949 | Certificate | 0.5 | 0 | 2 | CFS | RE IR |
| 2136513 | Surface Water | S3-*09983CWRIS | 11/15/1950 | Certificate | 0.25 | 0 | 20 | CFS | IR |
| 2136521 | Surface Water | S3-*10056CWRIS | 1/9/1951 | Certificate | 0.35 | 0 | 20 | CFS | IR |
| 2136320 | Surface Water | S3-*10872CWRIS | 11/13/1951 | Certificate | 1 | 0 | 105 | CFS | IR |
| 2136329 | Surface Water | S3-*10927CWRIS | 12/17/1951 | Certificate | 0.2 | 0 | 10 | CFS | IR |
| 2136385 | Surface Water | S3-*11366CWRIS | 5/19/1952 | Certificate | 0.18 | 0 | 18 | CFS | IR |
| 2136086 | Surface Water | S3-*11403CWRIS | 5/28/1952 | Certificate | 0.3 | 0 | 30 | CFS | IR |
| 2136074 | Surface Water | S3-*13099CWRIS | 8/24/1954 | Certificate | 0.09 | 0 | 7 | CFS | IR |
| 4675209 | Surface Water | S3-*13271C | 1/28/1955 | Superseding Certificate | 0.2 | 20 | 0 | CFS | CI CI |
| 2135830 | Surface Water | S3-*13621CWRIS | 9/12/1955 | Certificate | 2.92 | 16 | 4 | CFS | DS IR |
| 2135922 | Surface Water | S3-*14349CWRIS | 5/31/1957 | Certificate | 0.3 | 72 | 18 | CFS | IR |
| 2135726 | Surface Water | S3-*15284CWRIS | 2/12/1959 | Certificate | 0.04 | 8 | 2 | CFS | IR |
| 2135727 | Surface Water | S3-*15285CWRIS | 2/13/1959 | Certificate | 0.09 | 24 | 6 | CFS | IR |
| 2135544 | Surface Water | S3-*16571CWRIS | 3/10/1961 | Certificate | 0.15 | 32 | 8 | CFS | IR |
| 2135580 | Surface Water | S3-*17118CWRIS | 1/29/1962 | Certificate | 0.4 | 108 | 27 | CFS | IR |
| 2135611 | Surface Water | S3-*17567CWRIS | 10/15/1962 | Certificate | 0.04 | 10 | 2.5 | CFS | IR |
| 2135348 | Surface Water | S3-*17921CWRIS | 5/21/1963 | Certificate | 0.077 | 20 | 5 | CFS | DS IR |
| 2135060 | Surface Water | S3-*20210CWRIS | 4/20/1967 | Certificate | 0.05 | 9 | 3 | CFS | IR |
| 2135141 | Surface Water | S3-*20993CWRIS | 5/29/1968 | Certificate | 0.05 | 5.88 | 2 | CFS | ST IR |
| 2132451 | Surface Water | S3-01528CWRIS | 8/7/1969 | Certificate | 0.02 | 4 | 0 | CFS | ST DS |
| 2132347 | Surface Water | S3-01025CWRIS | 3/3/1970 | Certificate | 0.06 | 8.18 | 2 | CFS | CI IR |
| 2131606 | Surface Water | S3-22815CWRIS | 3/11/1974 | Certificate | 0.01 | 1 | 1 | CFS | DS IR |
| 2131442 | Surface Water | S3-23258CWRIS | 6/22/1974 | Certificate | 0.04 | 3 | 3 | CFS | IR |
| 2131394 | Surface Water | S3-23888C | 10/25/1974 | Certificate | 0.02 | 1 | 0 | CFS | WL |
| 2131393 | Surface Water | S3-23887C | 10/25/1974 | Certificate | 0.02 | 1 | 0 | CFS | WL |
| 2131392 | Surface Water | S3-23886CWRIS | 10/25/1974 | Certificate | 0.02 | 2 | 0 | CFS | DS CI |
| 2131196 | Surface Water | S3-24194CWRIS | 12/23/1974 | Certificate | 0.055 | 8.5 | 2.5 | CFS | DS IR |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 2130951 | Surface Water | S3-26091CWRIS | 11/15/1978 | Certificate | 0.01 | 1 | 0 | CFS | DS |
| 2130950 | Surface Water | S3-26090CWRIS | 11/15/1978 | Certificate | 0.015 | 1 | 0 | CFS | DS |
| 2143721 | Surface Water | S3-29209 | 5/27/1992 | Certificate | 0.02 | 2 | 1 | CFS | IR |
| 2144890 | Surface Water | S3-30282 | 3/15/2000 | Certificate | 0.01 | 3 | 0 | CFS | EN |
| *Subtotal* | | | | | *8.047* | *360.56* | *347* | *CFS* | |
| **Paradise Creek** | | | | | | | | | |
| 2136608 | Surface Water | S3-*08075CWRIS | 10/14/1947 | Certificate | 0.02 | 0 | 0 | CFS | DS |
| 2135830 | Surface Water | S3-*13621CWRIS | 9/12/1955 | Certificate | 2.92 | 16 | 4 | CFS | DS IR |
| 2132560 | Surface Water | S3-00522CWRIS | 12/8/1971 | Certificate | 0.3 | 0 | 0 | CFS | EN |
| 2143875 | Surface Water | S3-28336 | 4/29/1987 | Certificate | 0.01 | 3.6 | 1 | CFS | IR |
| *Subtotal* | | | | | *3.25* | *19.6* | *5* | *CFS* | |
| ***Total*** | | | | | ***11.297*** | ***380.16*** | ***352*** | ***CFS*** | |

**Attachment A.5 – Alta Science and Engineering Meeting Summary**

# Appendix G
# Fisheries Agencies Discussions

Jacobs

# Memorandum

99 West Main Street, Suite 1200
Boise, Idaho 83702
United States
T +1.208.345.5310
www.jacobs.com

| | |
|---|---|
| **Subject** | **Fishery Agencies Coordination** |
| **Project Name** | Palouse Groundwater Basin Alternative Water Supply (the Project) |
| **Attention** | Palouse Basin Aquifer Committee (PBAC) |
| **From** | David Fornander, Jacobs |
| **Date** | March 29, 2022 |
| **Copies to** | Robin Nimmer, Alta |

## 1. Background

PBAC requested support from Jacobs to engage in discussions with federal and state fisheries agencies regarding the supplementary water supply alternatives being contemplated in the basin. Outreach to the fisheries agencies was recommended by the Washington Department of Ecology during a previous call regarding water rights. The anticipated result of this fishery agency outreach is to identify potential concerns to Endangered Species Act (ESA) listed fisheries and their habitat, or other aquatic species that may be associated with the supplementary water supply alternatives.

## 2. Purpose

This memorandum has been developed to summarize early coordination and discussions with appropriate federal, state, and tribal entities that have a role in:

- Fisheries management
- Jurisdiction
- Protection
- Conservation

The goal of this early coordination was to facilitate coordination and identify any “red flags” or areas of specific concern to the Project alternatives that have not been previously identified.

## 3. Agency Coordination

The following subsections provide information regarding fisheries discussions and outreach with:

- National Marine Fisheries Service (NMFS)
- U.S. Fish and Wildlife Service (USFWS)
- Tribes
- Washington Department of Fish and Wildlife (WDFW)
- Idaho Department of Fish and Game (IDFG)

## 3.1 Communication with National Marine Fisheries Service

NMFS has jurisdiction over ESA-listed fish that have potential to be affected by the Project. These include Snake River steelhead, Chinook salmon, and sockeye salmon. As such, NMFS permitting would be required to move forward with a selected alternative, if the potential for effects to ESA-listed fish exists. All proposed alternatives are likely to require consultation with NMFS, and coordination with NMFS has been prioritized under this task. The Jacobs team reached out directly to NMFS in Boise, Idaho. Brief discussions about the Project were conducted by David Fornander (Jacobs) with Ken Troyer (Branch Chief, NFMS, Boise) via phone. Ken recollected a previous discussion with Ben Floyd (Anchor QEA) regarding the potential purchase of flows from another source as an offset related to Alternative 1 (pulling directly from the Snake River). This information may be relevant moving forward, once permitting and formal consultation with the agencies has been initiated. Aurele LaMontagne (NMFS, Boise) was identified as the likely point of contact for NMFS. Ken recommended that David initiate a conversation between David Fornander, Aurele LaMontagne, and himself to discuss the alternatives and potential concerns for fish. Ken also recommended that David include Claire McGrath (Hydro Division, NMFS) to provide insight relative to potential Federal Energy Regulatory Commission involvement.

On December 13, 2021, David Fornander, Robin Nimmer (Alta), and Paul Kimmell (PBAC team) met with Aurele LaMontagne and Claire McGrath to discuss Project alternatives and identify any related questions and/or concerns that NMFS may have. A brief written summary of the alternatives was distributed to NMFS for review prior to the call.

During the call and the alternatives discussion, primary concerns from NMFS were identified, for ESA-listed fish, related to alterations of flow and effects to water temperature. Although NMFS did not identify any specific red flags during the discussion of alternatives, and did not specifically identify one alternative that they favored, they did offer insight. Initial impressions from the discussion were that constructing a new dam and reservoir on Flannigan Creek (under Alternative 3) was perhaps the least favorable alternative. Claire McGrath recognized that 10-cubic feet per second (cfs) withdrawals represent a minimal amount relative to overall flows in the Snake River, and a direct capture of flows at the Granite Pool (under Alternative 1) seemed the most favorable and protective to potential concerns with Snake River steelhead utilizing the confluence and lower reaches of the Palouse River that would be affected under other alternatives.

At the close of the discussion, NMFS requested that the PBAC team provide a quantitative summary of how the various alternatives would be anticipated to alter flows in the Snake River and the lower Palouse River. This information was summarized in a spreadsheet and provided to NMFS in an email from Robin Nimmer, dated January 3, 2022. Additionally, NMFS recommended that David coordinate with USFWS and the Nez Perce Tribe relative to concerns that they may have related to fisheries and the current alternatives. A brief discussion of who the likely action agency would be once consultation was initiated occurred, at which point, the Bureau of Reclamation and the U.S. Army Corps of Engineers were identified.

No further discussions are likely necessary, to identify concerns related to ESA-listed fish under the jurisdiction of NMFS, until a permitting path under the National Environmental Policy Act (NEPA) and the ESA has been identified.

## 3.2 Communication with U.S. Fish and Wildlife Service

USFWS has jurisdiction over ESA-listed fish that have potential to be affected by the Project. This includes Columbia River bull trout. As such, USFWS permitting would be required to move forward with a selected alternative, if the potential for effects to ESA-listed fish exists. The Jacobs team reached out directly to

USFWS in Spokane, Washington. Brief discussions about the Project were conducted by David Fornander (Jacobs) with Erin Britton-Kuttel (Fisheries Biologist, USFWS, Spokane) via phone.

On January 24, 2022, David Fornander, Robin Nimmer, and Paul Kimmell (PBAC team) met with Erin Britton-Kuttel to discuss Project alternatives and identify any related questions and/or concerns that USFWS may have. A brief written summary of the alternatives and a spreadsheet that summarized how the various alternatives would be anticipated to alter flows in the Snake River and the lower Palouse River were provided to USFWS for review prior to the call.

During the call and the alternatives discussion, the primary concerns from USFWS were identified, for ESA-listed fish, related to direct effects from construction of the intake structure and screening and operation of the intake. These concerns were only applicable to Alternative 1 proposed for withdrawals directly from the Snake River. The other alternatives that would capture water from the Palouse River and/or its tributaries are not of concern to USFWS related to ESA-listed bull trout as they are not known to occupy these reaches or to have designated critical habitat there. USFWS did not identify any specific red flags during the discussion of alternatives as direct capture of 10 cfs at the Granite Pool is considered to be rather minimal. Still, a Biological Assessment would be required under Alternative 1. This is consistent with discussion with NMFS.

In addition to concerns surrounding ESA-listed bull trout, Erin wanted to confirm that the PBAC team were considering potential effects to Spalding's catchfly (*Silene spaldingii*) as they are known to occur throughout the Palouse Basin and would need to be considered in association with all alternatives. The PBAC team assured her that, moving forward, they would consider all potentially affected USFWS species.

The PBAC team also conveyed to Erin/USFWS that they had already conducted conversations with NMFS and anticipated pending discussions with both state agencies (WDFW and IDFG) and the tribes.

At the close of the discussion, USFWS requested that the PBAC team remain in touch related to progression of the Project. Erin was very helpful and is happy to assist with any further questions moving forward.

No further discussions are likely necessary, to identify concerns related to ESA-listed fish under the jurisdiction of USFWS, until a permitting path under NEPA and ESA has been identified.

## 3.3 Communication with the Tribes

The Nez Perce Tribe historically utilized waters in the Project area that may be potentially affected by the alternatives. Emmett Taylor was identified by NMFS as an initial contact for the Nez Perce Tribe that the PBAC team could reach out to. As Paul and Robin both have relationships and discourse already established with the Nez Perce Tribe, it was determined that the best initial path forward in identifying potential concerns related to fish and the proposed alternatives should be conducted through them.

On Tuesday, January 25, 2022, Paul and Robin met with representatives of the Nez Perce Tribe, including:

- Ken Clark (Head of the Water Resources Department)
- Allison Lebeda (Water Rights)
- Emmit Taylor (Fisheries)
- Bobby Hills (Fisheries)

The purpose of the meeting was to share information about the water supply alternatives and identify any related questions and/or concerns that they may have. The Nez Perce Tribe did not share any concerns about the Project. They said that they did not feel the need for a separate fisheries discussion. At the close of the discussion, the tribal representatives requested that the PBAC team remain in touch related to

progression of the Project. In the future, they would also like to have an opportunity to review documents related to the environmental assessments.

No coordination with the Confederated Tribes of the Umatilla has been anticipated as necessary at this time.

## 3.4 Communication with Washington Department of Fish and Wildlife

WDFW oversees the management and protection of fisheries in waters throughout the state of Washington. This includes ESA-listed salmon and steelhead, Columbia River bull trout, and other fish species that may have a state-listed status, or that provide recreation benefits to the state or otherwise. As such, WDFW will be involved in permitting under NEPA and the ESA, and will be engaged in the water rights discussion with the Washington Department of Ecology as PBAC moves forward with a selected alternative(s) to the extent in which those alternatives effect Washington waters. The Jacobs team reached out directly to WDFW.

Brief discussions about the Project were conducted by David Fornander (Jacobs) with Steve Boessow (WDFW, Olympia) via phone. Information describing the Project alternatives was sent to Steve and Melissa Mackelvie (WDFW, Spokane) in an email dated February 10, 2022, that included descriptions of the four initial alternatives being considered and a spreadsheet that summarized anticipated flows to be captured.

On February 22, 2022, the PBAC team, including Jason McCormick (McCormick Water Strategies), met with Steve and Melissa to discuss Project alternatives and identify any related questions and/or concerns that WDFW may have.

During the call and the alternatives discussion, WDFW identified that they had previously been opposed to the City of Pullman proposal to implement wastewater reuse, which would in turn reduce surface water returns to the South Fork Palouse River by approximately 40%. Under existing conditions, the City of Pullman wastewater discharge provides instream flow benefits to the South Fork Palouse River. In a broader context, this may be applied to a concern of WDFW that instream flow requirements are met as they pertain to various life stages of fish in these systems. A table identifying preliminary instream flow recommendations for the North Fork and South Fork Palouse River, as well as species assemblages in the drainages potentially affected by the various Project alternatives, will be distributed by WDFW to the PBAC team for review and reference. The initial table that Steve shared included instream flow values for rainbow trout (*Oncorhynchus mykiss*), cutthroat trout (*Oncorhynchus clarkii*), and mountain whitefish (*Prosopium williamsoni*). Steve thought he recalled an email thread, which noted that species of concern may include mountain sucker (*Catostomus platyrhynchus*). Instream flows for these systems were identified through analysis of toe width data (collected by Anchor QEA) using a best-fit regression of the physical habitat simulation (PHABSIM) model. It was discussed that, based on the preliminary instream flow recommendations, these drainages may not have the flow capacity to support anticipated withdrawals associated with some of the alternatives. **This may prove to be a limiting factor in water availability under the existing alternatives.** Additionally, it was noted that, in determining these instream flow requirements, data would likely need ground truthing to verify accuracy. Additional data collection, other methodologies (that is, critical riffle), and negotiation necessary to establish critical instream flows may also be required.

Steve went on to explain that WDFW typically prefers withdrawals to be linked to larger water bodies that can be better managed (such as the Snake River, or reservoirs systems) to protect instream flow requirements for various species of concern. In turn, the initial preference for WDFW from Steve's perspective would be Alternative 1 (Snake River withdrawal), followed by Alternative 3 (Flannigan Creek

Storage). Alternatives involving Paradise Creek and the North Fork and South Fork Palouse River flow reductions were anticipated to have more adverse effects related to diminished flow and potential temperature, as well as potentially being unfeasible based on the extent of flow available in these systems. Reductions in flows in the South Fork Palouse River pose the most initial concern for WDFW, especially during the irrigation season, when flows are already compromised.

The water rights process was also discussed briefly and Steve stated that, although the moratorium on Snake River permitting has been lifted, the timeline is multiple years out, relative to securing a water right. How water rights may play into the alternative selection discussion may need to be discussed directly with the Washington Department of Ecology for a better understanding of potential pitfalls in this arena.

A follow-up email from Steve was received on February 28, 2022. The email provided information regarding fish presence in Paradise Creek and the South Fork Palouse River. Steve also attached a short list of email conversations from the past, some of which the PBAC team may already have. Furthermore, the email provided toe width data and description relative to how it is used in the analysis of instream flows. The toe width method is based on numerous streams throughout Washington, in all regions. For critical decision-making, WDFW always recommends site-specific studies. If the Project could impact species of concern, WDFW anticipated that the PBAC team might also want to collect habitat suitability/availability data as well. These add cost and time that must be weighed against the Project. Steve only recommended further discussion of flows and studies if it looks like the Project is moving down the Palouse River/Paradise Creek surface diversion route. If the PBAC team is primarily considering the Snake River and the Flanigan Creek/storage options, then it would not be prudent to spend a lot of money up front on the others, as Steve anticipates that this will require additional discussion and coordination with WDFW.

Overall, it is fairly clear that WDFW prefers Alternative 1 (pulling flows from the Snake River) as it demonstrates clear reliability and less of a potential effect to limited flows in the upper tributaries. Alternative 3b (Flannigan Creek) was identified as the second preferred potential alternative. Regarding fisheries and more specifically meeting instream flow requirements set forth by WDFW, consistent and thorough communication with WDFW has been recommended moving forward.

## 3.5 Communication with Idaho Department of Fish and Game

IDFG oversees the management and protection of fisheries in waters throughout the state of Idaho. This includes ESA-listed salmon and steelhead, Columbia River bull trout, and other fish species that may have a state-listed status, or that provide recreation benefits to the state or otherwise. As such, IDFG will be involved in permitting under NEPA and ESA, and will be consulted with as PBAC moves forward with a selected alternative(s) to the extent in which those alternatives effect Idaho waters. The Jacobs team reached out directly to IDFG in Lewiston, Idaho. Brief discussions about the Project were conducted by David Fornander (Jacobs) with Joe Dupont (IDFG, Lewiston) via phone. Joe requested that information regarding the Project be sent to himself and Clay Hickey (IDFG), whom he anticipates would likely be the point of contact for IDFG regarding the Project. An email including descriptions of the four initial alternatives being considered and a spreadsheet that summarized anticipated flows to be captured was sent to Joe and Clay on January 28, 2022.

On March 1, 2022, David Fornander spoke with Clay via a phone call. During the call, David and Clay discussed the various alternatives. IDFG had some concerns that all the tributary alternatives (Alternatives 2, 3, and 4) may not provide reliable water sources for the communities of Pullman and Moscow. Clay expressed concerns, similar to those expressed by WDFW, that capture of full flows required for use from the Palouse River drainage, as well as Flannigan Creek, may be insufficient and may be restricted as instream flow requirements for fisheries and upland game (riparian concerns) would require a certain volume of flows to be left in the systems to accommodate required life history for the species, such

as spawning and rearing. Based on the existing information, IDFG preferred Alternative 1 as flows from the Snake River would be reliable during all times of the year and into the future, and would likely not trigger instream flow concerns as the other alternatives would. David thanked Clay for the insight provided and for review of the information, and IDFG requested to continue to be informed as the process moves forward.

## 4. Summarized Fishery Concerns and Conclusions

Based on discussions with the services (NMFS and USFWS), as well as the state (WDFW and IDFG), it is fairly clear that, from a fisheries perspective, capturing flows directly from the Snake River are preferred, followed by Flannigan Creek. From the services perspective, this is based on the volume of flows being proposed for use as contributing to less reduced relative volume and reduced thermal concerns. WDFW and IDFW were more specific in their concerns related to meeting instream flow requirements and that sufficient flows, with instream flow requirements in place, may not be available in any alternative with the exception of Alternative 1 and possibly Alternative 3b (Flannigan Creek).

## 5. Next Steps

The information provided in discussion with the agencies should provide PBAC with some very useful insight moving forward. It appears that all agencies have an initial preference for Alternative 1. If alternatives other than Alternative 1 are selected to move forward, the PBAC team should anticipate the need to confirm that reliable flows would be available, in conjunction with meeting state-required instream flows. Furthermore, considerations should include the potential added costs of investigating instream flows and potentially mitigating for fisheries that may be incurred under some of the alternatives, specifically relative to diminished instream flows and thermal impacts downstream, as well as any other costs related to mitigation. The PBAC team anticipates, based on these initial discussions, that higher mitigation costs could potentially be realized for Alternatives 2, 3, and 4. The PBAC team recommends that a thorough analysis of flows under the various alternatives be conducted to confirm that they would provide the quantities required based on the information provided in the previous sections. As we move further along in the process of permitting, it will also be important to coordinate with the determined action agency to ensure that they would champion any alternatives considered to move forward. Fisheries is of course only one resource that must be considered in our analysis of effect from the various alternatives, including water quality/quantity and cultural and economic resources, for example, in the NEPA and State Environmental Policy Act processes. Nonetheless, this initial investigation into fisheries concerns should help guide the project moving forward and highlight necessary consideration of other elements in weighing the potential costs and benefits of the various alternatives.

# Appendix H
# Interim Steps Memoranda

Jacobs

# Memorandum

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| | |
|---|---|
| **Subject** | **Water Supply Alternatives Interim Steps Technical Memorandum** |
| **Project Name** | Palouse Groundwater Basin Alternative Water Supply |
| **Attention** | Palouse Basin Aquifer Committee (PBAC) |
| **From** | Perrin Robinson |
| **Date** | July 2021 |
| **Copies to** | Robin Nimmer/Alta |

## 1. Background

The Palouse Basin Aquifer Committee (PBAC), and its predecessor committees, have been actively engaged for several decades in addressing the concerns with the declining groundwater level in the aquifer due to the almost exclusive reliance upon the aquifer for water use demands within the basin since withdrawals first occurred in the late 1800s. PBAC's primary role is to promote implementation of the Palouse Basin Groundwater Management Plan, as enacted in 1995, by its member entities. The member entities are the cities of Pullman, Moscow, and Palouse; Whitman and Latah counties; Washington State University (WSU); and University of Idaho (UI). One of PBAC's missions is to identify alternative water supply sources to supplement and possibly mitigate groundwater withdrawals.

Over the years, PBAC, its member entities, and federal and state agencies have conducted studies and evaluations of water supply alternatives and potential groundwater impact mitigation measures to implement. PBAC hired a consultant team beginning in 2015 "to evaluate previously studied water supply projects to determine the most promising supply projects for meeting existing and future supply needs in the Palouse groundwater basin" (PBAC 2017). The work performed by the consultant team culminated in a report entitled *Palouse Groundwater Basin Water Supply Alternatives Analysis Report* (PBAC 2017). This report identified 38 water supply and conservation projects that were subjected to a two-step screening process to winnow down the list for identification of the most viable alternatives to carry forward. Following the screening process, four alternatives were characterized to meet the regional supplemental water supply target.

## 2. Purpose

This technical memorandum has been developed to identify the opportunities for phasing each of the four water supply alternatives and describe the phasing approach with respect to required activities for project development and implementation and estimated phased project funding requirements.

Each of the four primary alternatives requires significant amounts of funding for project implementation. Phasing a project by pursuing interim steps in an organized approach allows the funding required to be spread out over a longer period of time and makes a project more achievable by the PBAC member

entities for securing smaller funding portions periodically as part of the overall program and avoiding the need to secure the total funding all at once. Additionally, phasing a project and realizing a portion of the water supply target will allow the basin entities to study and evaluate the project effects on the aquifer to inform the timing to implement to follow-on phases.

# 3. Alternative Descriptions

The following provides brief summary descriptions of the four alternatives that emerged from the previous work performed by others. Refer to the PBAC 2017 report for more full descriptions of the projects. Figures depicting the alternatives are provided in Section 4.

## 3.1 Alternative 1

Alternative 1 consists of a new diversion intake structure located on the Snake River in the Lower Granite Dam pool near the Wawawai Canyon, conveyance system with approximately 25-miles of pipeline, five pump stations, four storage tanks, a water treatment plant, and water delivery to Pullman/WSU and Moscow/UI existing water distributions systems.

## 3.2 Alternative 2

Alternative 2 is comprised of two distinct project elements which are (1) a new North Fork Palouse River diversion and (2) Paradise Creek or South Fork Palouse River recharge for Moscow.

The North Fork Palouse River diversion portion of the alternative entails a new river diversion intake structure, two pump stations, one storage tank, a water treatment plant, conveyance pipelines, energy recovery system, and water delivery to Pullman/WSU and Moscow/UI existing water distributions systems.

The Moscow aquifer recharge portion of the alternative includes a new river diversion intake on either Paradise Creek or South Fork Palouse River, pump station, water treatment plant, and recharge well(s).

## 3.3 Alternative 3

Alternative 3 is also comprised of two distinct project elements: (1) Flannigan Creek Storage and (2) South Fork Palouse River Diversion.

The Flannigan Creek Storage portion of the alternative consists of a new 102-foot tall dam on Flannigan Creek creating 6,600 acre-feet of storage, reservoir outlet works, two pump stations, one storage tank, approximately 13-miles of pipeline, energy reduction in-line hydropower generation facility, a water treatment plant, and water delivery to Moscow/UI existing water distributions systems.

The South Fork Palouse River Diversion portion of the alternative a new diversion intake structure, river intake pump station, water treatment plant, and a pipeline for water delivery to the Pullman existing water distribution system for use in Pullman and WSU.

## 3.4 Alternative 4

Alternative 4 is a combination of five unique elements consisting of:

1) Paradise Creek Aquifer Recharge – a new diversion structure on Paradise Creek near Moscow, river intake pump station, water treatment plant, and active injection of treated water to recharge wells in Moscow.

2) South Fork Palouse River Aquifer Storage and Recovery (ASR) – a new diversion structure on South Fork Palouse River in or near Pullman, river intake pump station, water treatment plant, and active injection of treated water to ASR wells in Pullman.
3) Pullman Wastewater Reuse – an upgrade to the Pullman Wastewater Treatment Plant (WWTP) to produce Class A reclaimed water, reclaimed water pump station, storage tank, and distribution pipes for reuse at sites in Pullman and the WSU campus.
4) Moscow Water Reuse – upgrades to the Moscow WWTP to meet the Class A reclaimed water requirements, reclaimed water pump station, conveyance pipeline, and infiltration basins for passive infiltration of reclaimed water into the aquifer.
5) Additional Conservation – additional water conservation measures resulting in 15 percent additional savings, beyond the baseline projection, that have yet to be determined but would include reducing landscape irrigation beyond those that have already been implemented.

# 4. Alternative Interim Steps Descriptions

The four alternatives were evaluated independently of each other to identify opportunities for establishing interim steps that could be achieved to frame phased projects. Alternatives 1 and 2 have interconnectivity that informed the phase development whereas the other two alternatives are comprised of separate, discrete projects that are inherently divided to form the basis for interim step definition. Each of the alternatives has a number assigned (e.g. Alternative 1) and lettering was assigned to each of the phases (e.g. Alternative 1A) to distinguish between the various associated construction elements.

Additionally, each of the identified phases for an alternative were evaluated to determine if there were opportunities to group facility construction steps and assign the bundled construction steps as bid packages. Assigning bid packages within a phase of an alternative allows similar construction work to be bid and constructed by contractors that specialize in that type of work. Assigning bid packages also allows for a greater degree of flexibility for design, bid, and construction where one bid package can be advanced more quickly for construction work that can and/or needs to occur earlier while other design and construction requires more time or needs to occur later once the early construction is completed. The identified bid packages were assigned an alpha numeric designator as well aligned with the phased alternative.

## 4.1 Alternative 1

For Alternative 1, two interim steps are envisioned with the first phase (Alternative 1A) consisting of the Snake River diversion, water treatment plant, and the associated conveyance system with water delivery to Pullman/WSU. For Alternative 1A, pump stations and water treatment plant would be constructed, and equipment installed to accommodate this first portion of design flow and allow for capacity expansion when the subsequent phase is advanced. The second phase (Alternative 1B) consists of flow and treatment capacity expansions to the pump stations and water treatment plant and the conveyance system (pump station and pipeline) for water delivery to Moscow/UI. Figure 4-1 shows Alternative 1 phasing.

Two bid packages have been identified for Alternative 1A. Bid package 1 consists of the river intake, conveyance system to the water treatment plant, and the conveyance system to Pullman/WSU. Bid package 2 is focused on the water treatment plant portion of work.

Alternative 1B is listed as bid package 3 with each work element bundled under one package; however, the water treatment plant capacity expansion work could be carved out as a stand-alone bid package separate from the conveyance system work.

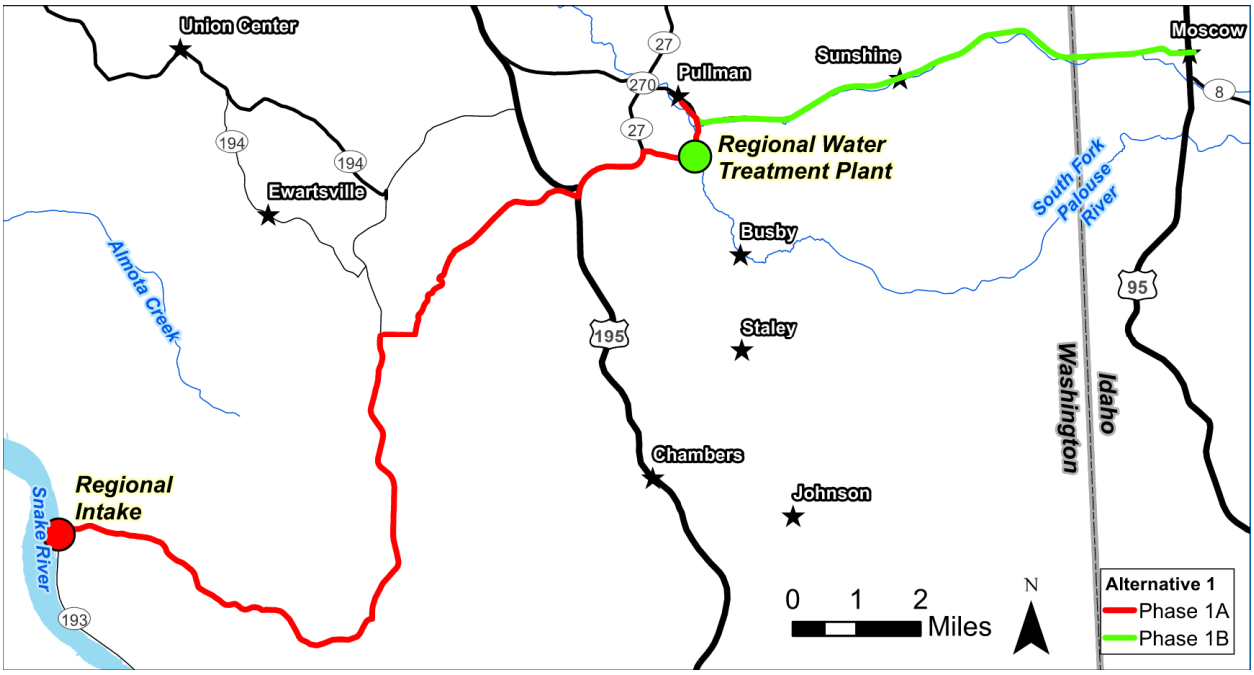


**Figure 4-1. Alternative 1 Phasing**

## 4.2 Alternative 2

Alternative 2 can first be separated into the Paradise Creek/South Fork Palouse River aquifer recharge for Moscow project and the North Fork Palouse River diversion project. The Paradise Creek/South Fork Palouse River aquifer recharge for Moscow project (Alternative 2A) is not shown to be broken down further into smaller phases given that it is a discrete project; however, there is an opportunity to phase the construction of the water treatment and recharge wells if a strategic reason for doing so is identified later. Within Alternative 2A, two bid packages have been identified with one bid package for the water treatment plant work and one bid package for diversion structure, pump station, and recharge wells.

The North Fork Palouse River diversion project (Alternative 2B) can be implemented in two phases with Alternative 2B1 consisting of the river intake and pump station, conveyance to the water treatment plant, water treatment plant, and the conveyance system for water delivery to Pullman/WSU. Alternative 2B1 is viewed as two bid packages with one bid package associated with the water treatment plant and the second bid package associated with the other work elements. Alternative 2B2 entails increasing the pumping capacity at the intake pump station, increasing the treatment capacity at the water treatment plant, increasing pumping capacity for conveyance to Moscow, and the conveyance system for water delivery to Moscow/UI. Alternative 2B2 is seen to be constructed as one bid package, but could be accomplished issuing two packages with one focused on the water treatment plant capacity expansion.

Figure 4-2 depicts Alternative 2 phasing.

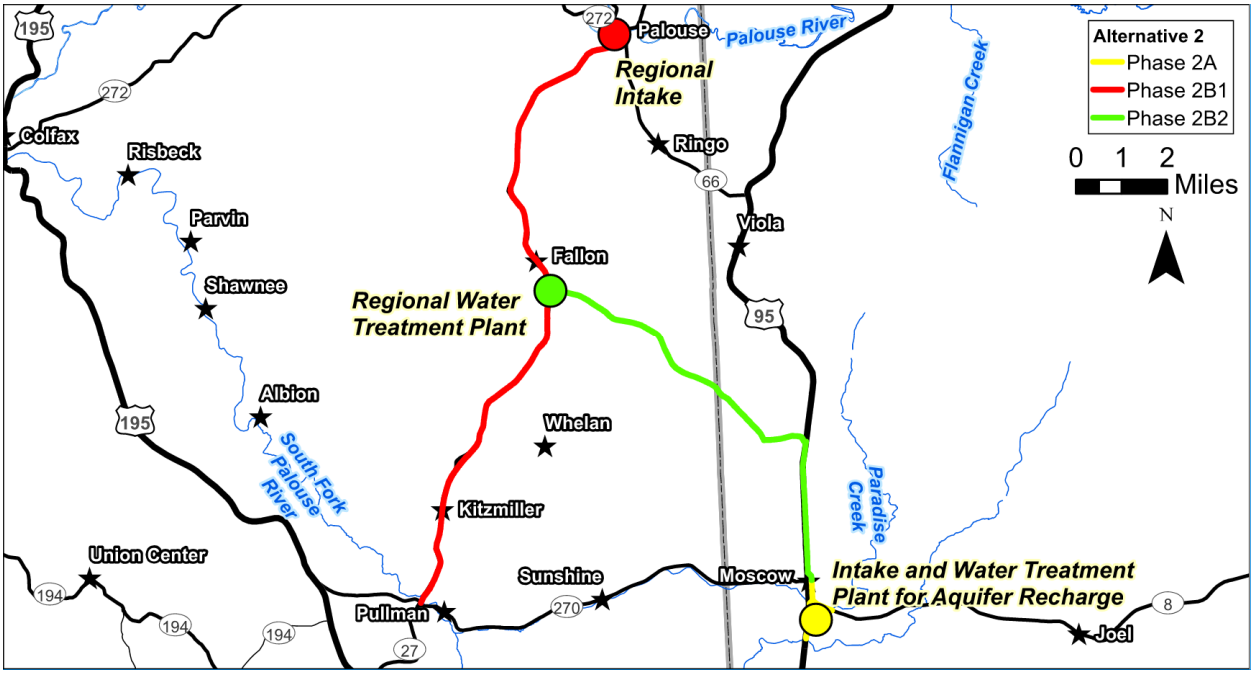


**Figure 4-2. Alternative 2 Phasing**

## 4.3 Alternative 3

Alternative 3 has two distinct, discrete project elements that suggest implementing it in two phases, with one phase being the South Fork Palouse River diversion for Pullman/WSU (Alternative 3A) and one phase aligned with the Flannigan Creek storage, conveyance, and treatment for Moscow/UI (Alternative 3B). Figure 4-3 depicts Alternative 3 phasing approach.

Alternative 3A has been identified to be implemented as two bid packages, with one bid package associated with the water treatment plant and the other bid package containing the river intake and conveyance system.

Alternative 3B is envisioned to consist of three bid packages based on the following:

- Bid package 1 – Flannigan Creek Reservoir and outlet works
- Bid package 2 – conveyance system to the water treatment plant inclusive of the in-line hydropower generation facility
- Bid package 3 – water treatment plant and water delivery pipeline to Moscow/UI

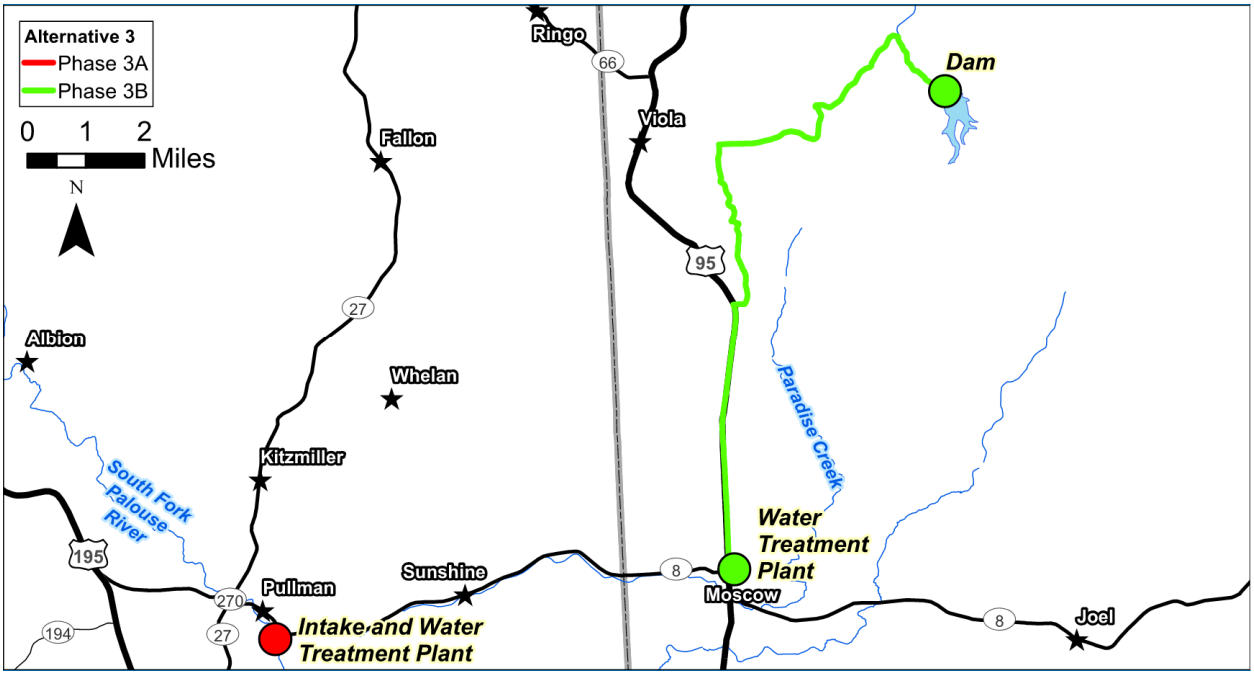


**Figure 4-3. Alternative 3 Phasing**

## 4.4 Alternative 4

Alternative 4 consists of five distinct, discrete project elements that are can be viewed as five separate phases. The following lists the phase designation assignments and the implementation sequencing determined by others as provided in the PBAC 2017 report.

- Alternative 4A - South Fork Palouse River ASR in Pullman
- Alternative 4B - Paradise Creek aquifer recharge in Moscow
- Alternative 4C – wastewater reuse in Pullman
- Alternative 4D – wastewater reuse for groundwater recharge in Moscow
- Alternative 4E – additional water conservation measures

Figure 4-4 shows the phase locations for Alternative 4.

A total of four bid packages are envisioned, one each for Alternatives 4A, 4B, 4C, and 4D. Alternative 4E is currently not well defined in terms of what actual measures will be implemented and Jacobs believes that this alternative will be based on incentive initiatives for the public to implement over some indeterminate amount of time. Therefore, Jacobs has not characterized Alternative 4E as a bid package for construction.

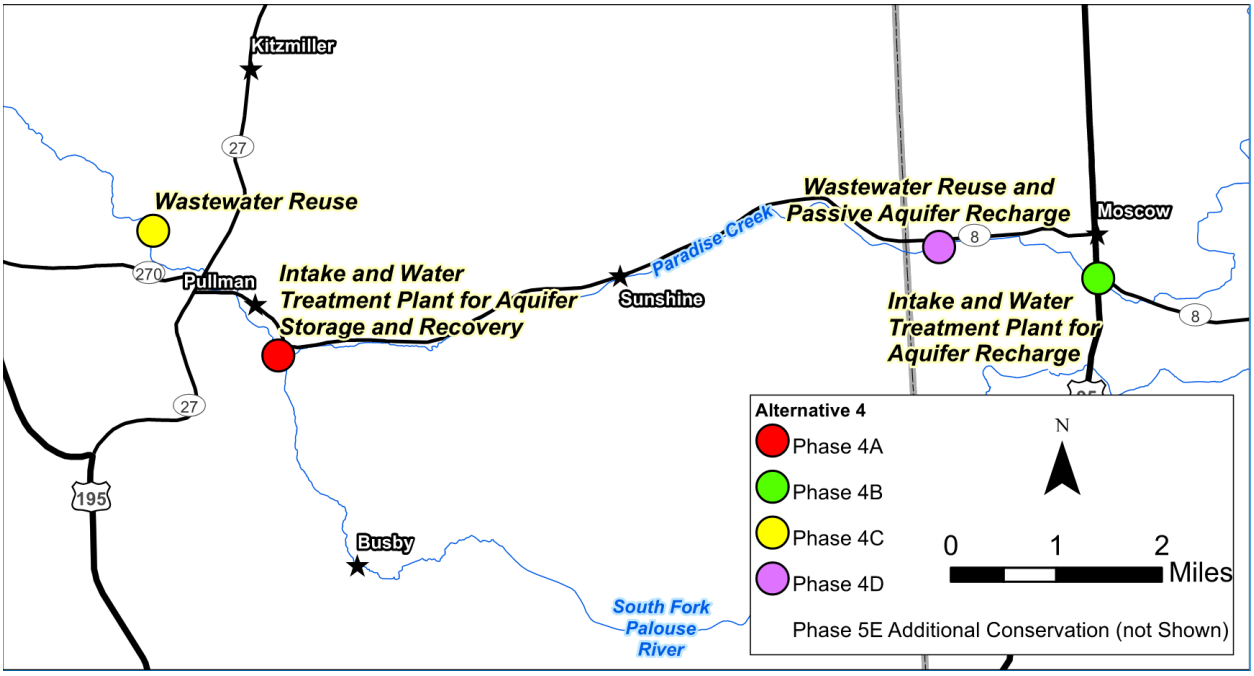


**Figure 4-4. Alternative 4 Phasing**

Alternatives 1A and 2B1 have been packaged to supply water to Washington and the follow-on phases Alternatives 1B and 2B2 would expand capacity to supply water to Idaho. These two alternative phasing plans were framed to allow the water that is diverted in Washington to stay in Washington and avoid interstate water transfer during the first phase. Since interstate water transfer will require legislative action in both Washington and Idaho, a multi-year process will likely be required to establish the framework. A phase one project consisting of water diversions in Washington that are conveyed to supply water in Idaho could be significantly delayed in getting completed while the legislative processes are resolved.

# 5. Project Development Activity Descriptions

To assist in developing a roadmap for advancing a preferred alternative once one is selected, typical project development activities have been generated and included to supplement the project phasing assignments described in Section 4. The following is a list of the project development activities that have been mapped to the alternatives phasing:

- Pre-construction funding procurement
  - This activity would occur as a first step to provide the necessary funds to support all of the tasks leading up to construction bidding and procurement.
- Construction funding procurement
  - This activity occurs as project design and permitting are being completed to line up the needed funds to pay for the actual construction of the water supply project.
- Water rights acquisition
- Water quality data collection
  - Depending on the selected preferred alternative, there may be adequate historical water quality data available to inform the design; however, this activity is shown for each alternative as a conservative placeholder on the basis that data will need to be collected for any of the projects.

- Geotechnical pre-feasibility screening and evaluation
  - This activity is envisioned to only be needed for the Alternative 3 Flannigan Creek Reservoir dam project as a typical task for any dam design.
- Feasibility, project definition, route study, site selection, and facility siting (5 percent design)
  - This activity would leverage the previously prepared high-level planning and project vision reports to define design criteria, pipeline routes, and land and easement acquisition requirements. The information would also support initial environmental planning and outreach.
- Preliminary environmental review
  - This activity would allow for early engagement with federal and state agencies in anticipation of environmental permitting for U.S. Army Corps of Engineers (USACE) Clean Water Act Section 401 and 404 permits and National Environmental Policy Act (NEPA)/Washington State Environmental Policy Act (WA SEPA)/Idaho Department of Environmental Quality Environmental Impact Document (IDEQ EID) permitting, assuming that federal and state funds will be used for project implementation.
- Memorandums of Agreement (MOAs) and land/easement acquisitions required for project implementation
- Topographic and bathymetric surveying of the project facility locations and pipeline corridors
- Geotechnical field exploration of the facility locations and pipeline corridors
- Preliminary (30 percent) design
- NEPA, WA SEPA, and/or IDEQ EID review process
- Water treatment equipment pre-selection and pilot testing
- Final design
- Permitting for USACE Clean Water Act Section 404 permit, highway/road right-of-way encroachment, stormwater general permits, water treatment plant permits to construct, etc.
- Construction bidding, award, and contracting for each bid package
- Long-lead time equipment and material manufacturing and delivery
- Construction, facility startup, and commissioning

# 6. Construction and Soft Cost Allocations

Water supply project cost summaries for each of the four alternatives were provided in the PBAC 2017 report and were generated in terms of October 2016 dollars. The values from these cost estimate values served as the basis for cost allocations to each of the sub-alternative construction elements. These construction element cost allocations have been escalated to May 2021 dollars through application of the Engineering News-Record Construction Cost Index numbers resulting in a 14.9 percent increase from October 2016 dollars to account for inflation and other market price adjustments.

For the alternatives that have full pump station and water treatment plant construction apportioned between two phases, the following allocations have been applied to account for the initial, phase one construction and the follow-on, phase two capacity increase construction:

- Pump station(s)
  - 95 percent of total facility construction cost applied to the initial, phase one construction. The facility foundations, enclosure, pump bays, and other infrastructure would be constructed to accommodate full build-out capacity. The additional pumps, electrical equipment and wiring, and pump discharge piping and valves would be installed as part of the follow-on capacity expansion construction effort.
  - 5 percent of total facility construction cost applied to increase capacity for second phase of construction. A factor of 1.1 has been applied to this second phase cost to account for the extra cost associated with a separate contractor procurement process, equipment/material cost increases due to time lag, and contractor remobilization.
- Water treatment plant
  - 85 percent of the total facility construction cost applied to the initial, phase one construction. The facility foundations, enclosures, water holding structures, yard piping, and other infrastructure would be constructed to accommodate full build-out capacity. The additional equipment and material required to bring the additional treatment train elements online for increased full build-out capacity would be installed as part of the follow-on capacity expansion construction effort.
  - 15 percent of the total construction cost applied to increase treatment capacity for second phase of construction. A factor of 1.1 has been applied to this second phase cost to account for the extra cost associated with a separate contractor procurement process, equipment/material cost increases due to time lag, and contractor remobilization.

The sales tax as noted below was included in a portion of the PBAC 2017 report's cost estimates and have been carried forward for the costs documented in this technical memorandum for consistency between the documents:

- A 6 percent sales tax is applied to the Flannigan Creek Reservoir and Outlet Works portion of Alternative 3.
- A 7.8 percent sales tax is applied to the construction costs associated with the "Wastewater Reuse in Pullman" portion of Alternative 4 (Alternative 4C). The PBAC 2017 report used a value of 7.6 percent; however, current combined Washington state and Whitman County sales tax is 7.8 percent.

In the PBAC 2017 report, a 20 percent contingency cost factor was applied to each alternative with the exception of the Wastewater Reuse for Groundwater Recharge in Moscow portion of Alternative 4 (Alternative 4D) for which a 50 percent contingency was applied. The costs reported in this technical memorandum have applied the same contingency factor values for consistency.

The PBAC 2017 report applied a 15 percent lump sum cost for engineering design and support during construction. In Jacobs' experience, the total engineering costs incurred are typically on the order of 25 percent of construction costs for project development from design inception through final construction completion. Therefore, the engineering cost reported in this technical memorandum is established by applying a 25 percent cost allocation to the construction cost estimate without contingency and includes engineering involvement as follows:

- Design (10 percent)
- Permitting support (exclusive of environmental permitting), bidding support, services during construction, startup and commissioning, and supervisory control and data acquisition (SCADA) integration (15 percent, collectively)

The PBAC 2017 report did not include costs for other soft costs beyond engineering that are required to support project design and implementation but have been accounted for in this technical memorandum. The following is a list of additional soft costs that have been added and an explanation of how the associated cost was established:

- Topographic and bathymetric surveying – costs are estimated to be 0.5 percent of the construction cost estimate exclusive of contingency.
- Geotechnical field exploration – costs are estimated to be 1 percent of the construction cost exclusive of contingency.
- Environmental permitting – cost is estimated to be 25 percent of the design cost.

A cost for water rights acquisition was derived for the Alternative 1 Snake River diversion in the PBAC 2017 report but comparable costs were not shown for the other alternatives. The same approach was followed in this technical memorandum for consistency; however, this appears to be a cost that is presently unaccounted for with respect to Alternatives 2, 3, and 4.

# 7. Activity Duration Assignments

Duration assignments for the project implementation activities included in this reporting have been established and assigned based on Jacobs' experience for other similar projects. A few additional comments pertaining to individual activities are as follows:

- The durations for pre-construction funding and construction commitment funding are assumed and could be shorter or longer for the actual time required to complete.
- The duration assigned for the water rights acquisition activity are based on professional judgement of approximated longest time typically encountered in Washington and Idaho to complete the process.
- The duration for time required to establish MOAs and land/easement acquisitions for facility siting and pipeline corridors is assumed and could vary depending on land ownership entity engagement.
- The durations assigned for the construction period could be impacted if electrical power upgrades are needed to support new facilities, rock is encountered during construction that would reduce daily productivity, and/or other unforeseen conditions that could cause delays.

# 8. Schedule Development

Project implementation schedules have been prepared for each alternative and their respective phasing plans to provide a vision of how each alternative could unfold as PBAC moves forward once a preferred alternative is identified. The project implementation activities with the associated durations have been mapped to the alternative phases and associated project elements. An assumed project implementation start date is applied.

It is assumed the following project implementation activities would be performed for the alternative as a whole prior to advancing a specific phase, since these activities need to be completed to inform and serve as the basis for the subsequent activities:

- Water rights acquisition
- Water quality data collection
- Geotechnical pre-feasibility screening and evaluation (Alternative 3B Flannigan Creek Reservoir dam project only)

- Feasibility, project definition, route study, site selection, and facility siting (5 percent design)
- Preliminary environmental review
- MOAs and land/easement acquisitions required for project implementation
- Topographic and bathymetric surveying of the project facility locations and pipeline corridors
- Geotechnical field exploration of the facility locations and pipeline corridors
- Preliminary (30 percent) design
- NEPA, WA SEPA, and/or IDEQ EID review process

Upon completion of these activities, each schedule is broken down into phases and bid packages, as described previously. The first activity for the phase is to secure final funding and then each phase is broken down into bid packages which consist of the following sequence of activities:

- Treatment Equipment Pre-Selection and Pilot Testing (where applicable)
- Final Design
- Permitting
- Bid/Award/Contracting
- Equipment/Material Manufacturing and Delivery (where applicable)
- Construction

In some cases, bid packages consist of multiple discrete elements with separate activity durations. In those cases the longest activity duration sets the duration of the bid package.

Within each schedule, some time lag has been included between phases and bid packages in order to minimize the number of overlapping activities and reduce the monthly cash flow burden of the alternatives. The lag between phases and bid packages, as well as the sequence of the same, in the schedules and cash flow documents is somewhat arbitrary. In the future, a final packaging, sequencing, and phasing plan will need to be developed to dovetail with actual funding schedules and constraints.

# 9. Results

The alternative project phasing assignments, project cost estimates, bid package assignments, and project implementation activities and their estimated durations are documented in Attachment 1. Detailed phased alternative project implementation schedules are provided in Attachment 2.

Example cash flow charts for each phased alternative have been developed and are shown in Figures 9-1 through 9-4. These cash flow charts are based on allocations of the costs provided in Attachment 1 to the project implementation schedules provided in Attachment 2. The cash flow charts are intended to provide PBAC with graphical representations of how the project costs could potentially be incurred over time to complete each alternative with an assumed implementation start date. The cash flow charts below were developed based on a flatline allocation of costs to activities in each schedule, as appropriate. Attachment 3 tabulates the cost breakdown for the example cash flow charts.

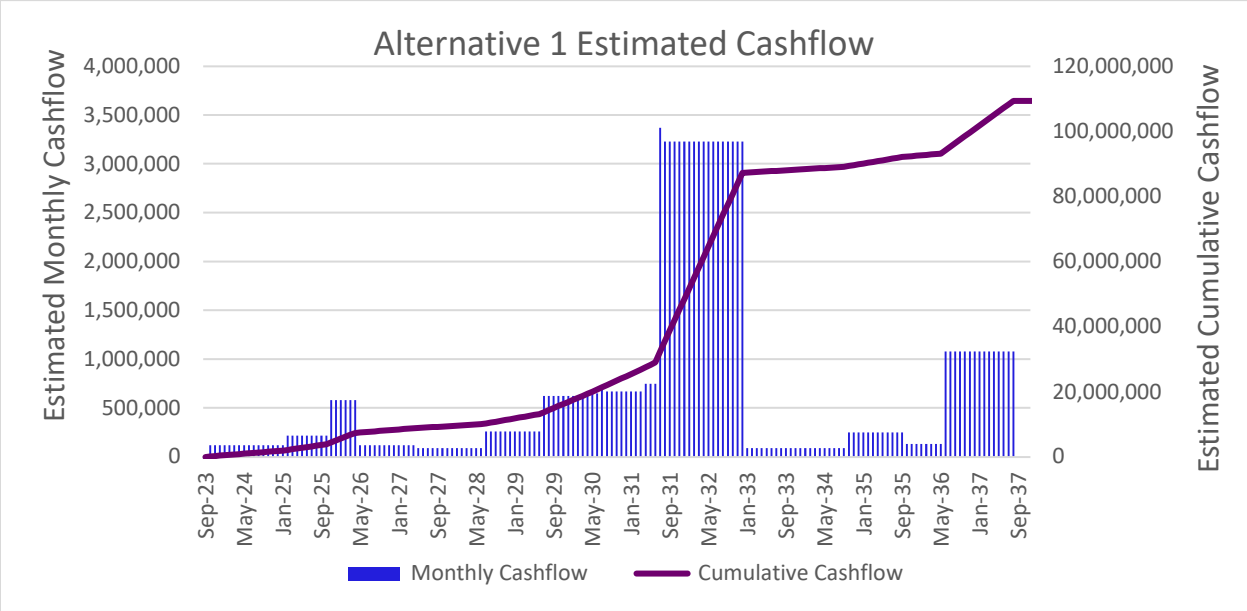


**Figure 9-1. Alternative 1 Phased Cash Flow Chart Example**

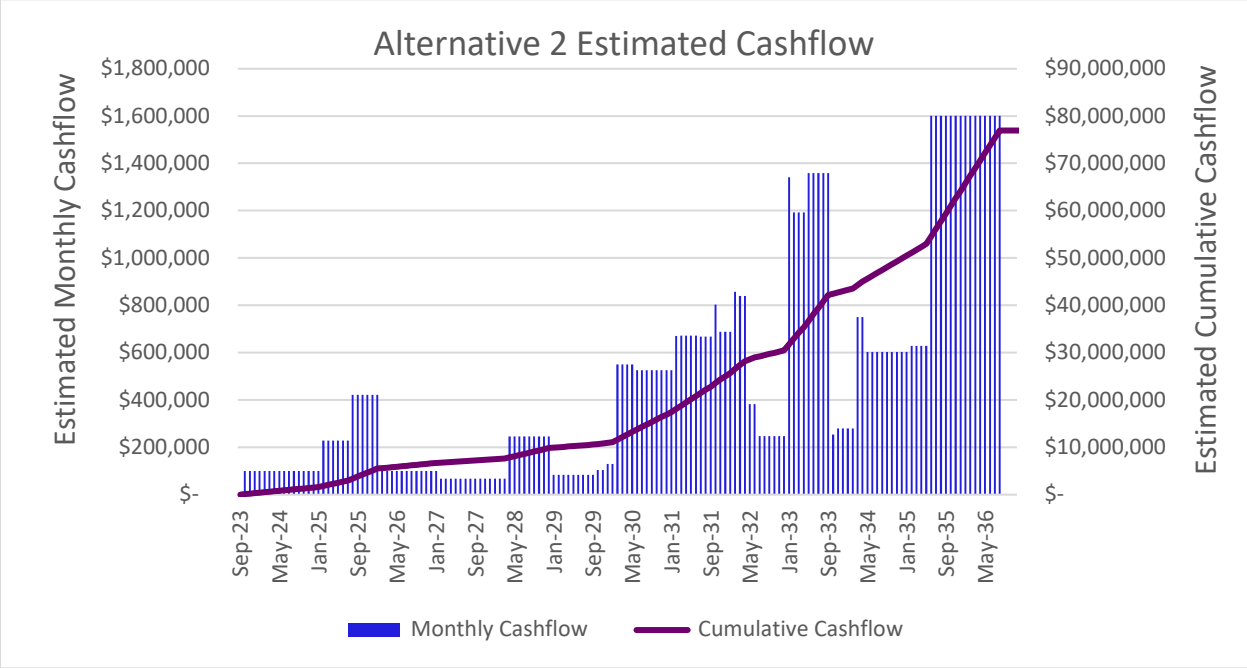


**Figure 9-2. Alternative 2 Phased Cash Flow Chart Example**

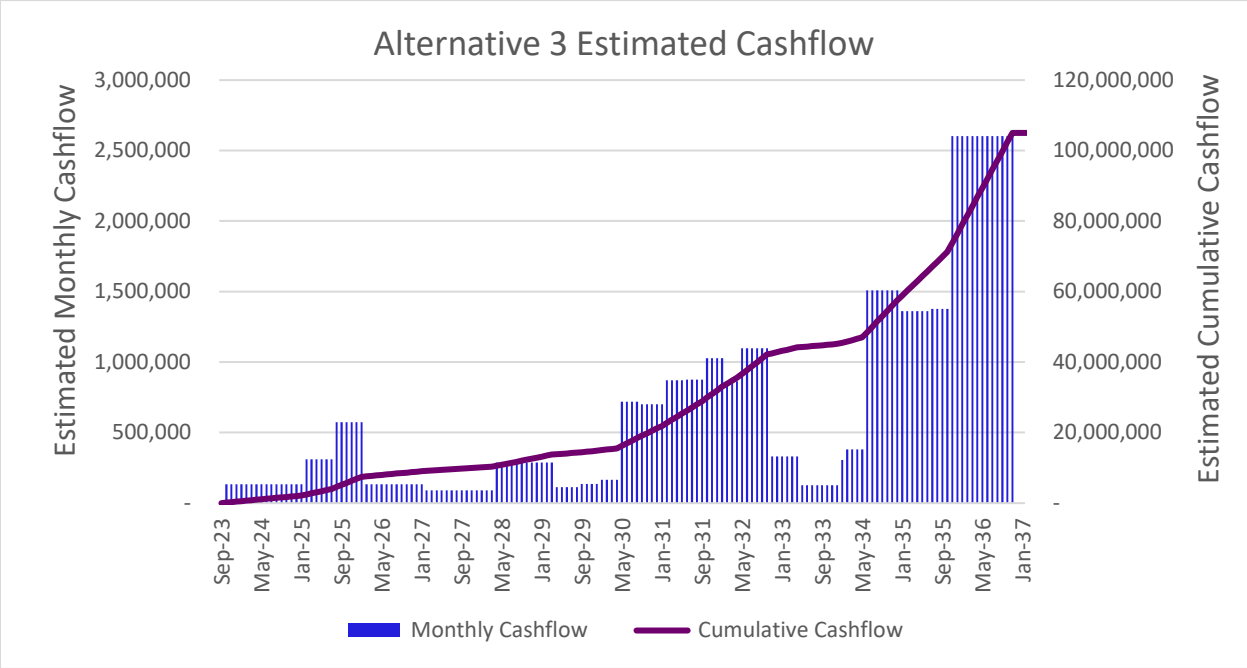


**Figure 9-3. Alternative 3 Phased Cash Flow Chart Example**

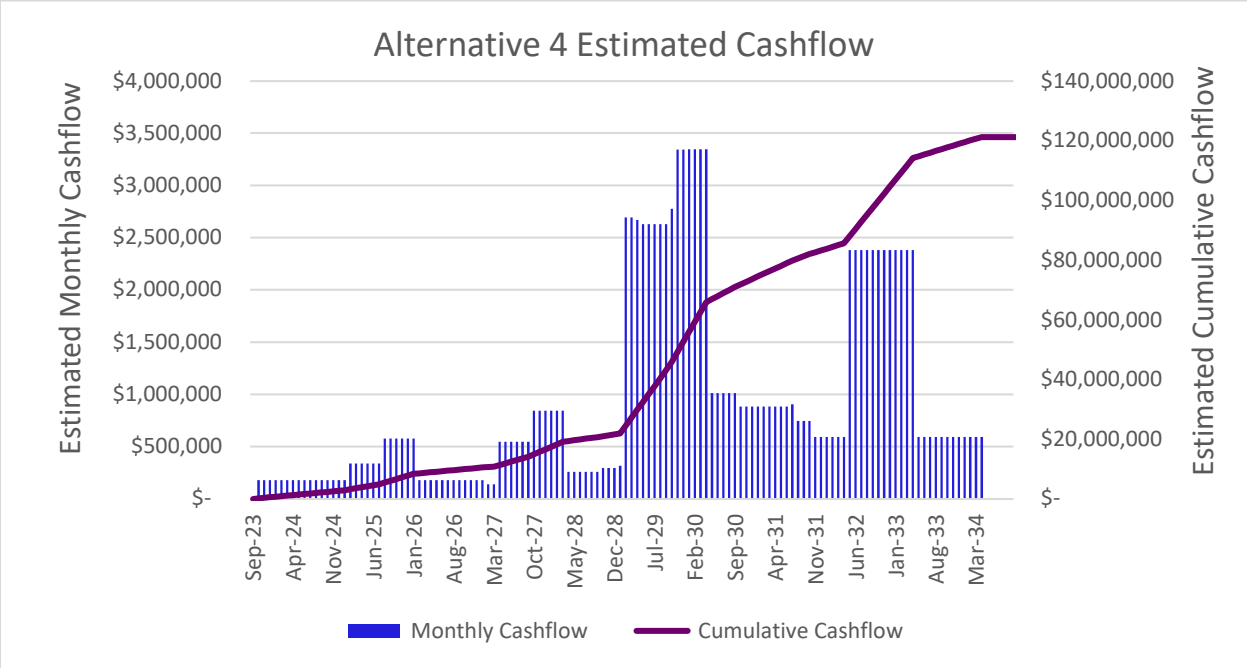


**Figure 9-4. Alternative 4 Phased Cash Flow Chart Example**

# 10. Other Considerations

A local utility provider is currently conducting a business case evaluation of a possible new off-channel pumped storage reservoir and hydropower facility that would be located along the Snake River. The utility is evaluating the feasibility of multiple project locations with one proposed site in the same general vicinity as the Snake River intake for Alternative 1 described in this technical memorandum. The utility is exploring

the viability of a pumped storage hydropower project as they move towards adding more renewable resource projects to their portfolio and reducing their carbon footprint and greenhouse gas emissions. If the utility determines that a project meets their business goals and selects the proposed Alternative 1 location, PBAC could benefit by defraying a portion of the costs associated with Alternative 1. PBAC could negotiate with the utility for additional reservoir storage volume as an off-channel source of supplemental surface water for the Palouse basin. Assuming the decision by the utility and successful negotiations between the utility and PBAC, the potential exists that a portion of costs associated with Alternative 1 would be paid for in full or in part by the utility pertaining to the water rights, intake structure, and pump station. There would likely be a cost to PBAC for constructing the additional reservoir storage capacity. Should this pan out, Alternative 1 could become less expensive overall and could affect its ranking amongst the other three water supply alternatives.

# 11. Next Steps

Based on Jacobs' understanding, PBAC will perform the following as they work towards selecting a preferred alternative to advance:

- Continue to evaluate the four alternatives
- Engage the public for input on the alternatives
- Conduct initial conversations with fisheries agencies that could influence alternative viability
- Continue to explore water rights options and implications for new surface water withdrawals in Idaho and/or Washington
- Pursue an interstate water transfer compact between Washington and Idaho

Once a preferred alternative is selected, PBAC is encouraged to revisit this document with respect to project implementation activities and their associated durations for refinement. For example, an evaluation of the water quality data that has been collected and available for use may determine the data is adequate to inform a design and, therefore, this activity can be eliminated from the project implementation schedule and cash flow chart.

The information contained in this document is intended to serve as a tool for later refinement and use as PBAC works through the process of pursuing a project. The project implementation schedules can be updated to enter more accurate project implementation start dates as they become known. The cash flow charts can be updated as more refined construction cost estimates are developed.

Based on the evaluation being performed as described in Other Considerations, PBAC is encouraged to monitor news and updates regarding a potential new off-channel pumped storage hydropower project that could emerge and positively impact Alternative 1 project implementation considerations and ranking.

# 12. References

Palouse Basin Aquifer Committee (PBAC). 2017. *Palouse Groundwater Basin Water Supply Alternatives Analysis Report*. March.

# Attachment 1
# Alternative Project Phasing Plan Summary

## Alternative Project Phasing Plan Summary

| Alternative No. | Alternative Description | Sub-Alt ID | Sub-Alternative Description | Sub-Alternative Elements | Construction Cost Estimate (Oct 2016 Dollars) | Construction Cost Estimate (Escalated to May 2021 Dollars) | Contingency [1,2] | Surveying / Bathymetry [3] | Geotechnical Field Exploration [4] | Engineering [5] | Phased Portion of Environmental Permitting [6,7] | Total Estimated Costs | Pre-Construction Funding [8] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Snake River Diversion and Pipeline to Pullman and Moscow (Project 11, Regional) | | | | | | | | | | | | |
| | | | | Water Rights | $ 13,440,000 | $ 15,444,162 | | | | | | | |
| | | | | River Intake and Pump Station | $ 2,360,879 | $ 2,712,931 | | | | | | | |
| | | | | Conveyance Pipeline, Pump Stations, and Storage Tanks to WTP | $ 22,639,341 | $ 26,015,303 | | | | | | | |
| | | A | Snake River Diversion and Conveyance to Pullman | | | | $ 11,947,943 | $ 221,478 | $ 442,956 | $ 14,934,928 | $ 1,493,493 | $ 88,780,510 | 12 months |
| | | | | Water Treatment Plant (WTP) | $ 12,906,732 | $ 14,831,373 | | | | | | | |
| | | | | Conveyance to Pullman/WSU (pipeline) | $ 640,441 | $ 735,943 | | | | | | | |
| | | | | Increase Capacity for Conveyance to WTP | $ 1,310,699 | $ 1,506,149 | | | | | | | a portion |
| | | B | Conveyance to Moscow | Increase WTP Treatment Capacity | $ 2,505,424 | $ 2,879,031 | $ 2,828,346 | $ 70,709 | $ 141,417 | $ 3,535,433 | $ 353,543 | $ 21,071,179 | covered as part |
| | | | | Conveyance to Moscow/UI (pipeline, pump station) | $ 8,490,460 | $ 9,756,550 | | | | | | | of funding |

**Notes:**

1) Contingency applied to Alternatives 1, 2, 3, 4A, 4B, and 4C is 20 percent, which is consistent with previous estimating.
2) Contingency applied to Alternative 4D is 50%, which is consistent with previous estimating.
3) Surveying costs are based on applying 0.5% to the construction cost estimate without contingency applied.
4) Geotechnical field exploration cost established by applying 1% to the construction cost estimate without contingency applied.
5) Engineering cost estimated to be 25 percent of construction cost estimate exclusive of contingency and includes design, permitting support (exclusive of environmental), bidding support, services during construction, startup and commissioning, and SCADA integration. Engineering cost shown for Alternative 3 Flannigan Creek Reservoir does not include costs associated with geotechnical field explorations, borings, and laborartory testing that would be required to support the design of the dam.
6) Environmental permitting cost estimated to be 25 percent to project design cost. Project design cost is assumed to be 10 percent of the construction cost exclusive of contingency.

7) Environmental permitting would be performed for each alternative as a whole but the cost has been applied to each sub-alternative to establish a total cost for each sub-alternative.
8) Durations for pre-construction funding and construction funding commitment are assumed.
9) Water rights acquisition duration based on professional judgement of approximated longest duration typically encountered in WA and ID.
10) Water quality data collection may not be required based on which alternative is selected to be advanced and historical data that may already be available. Activity with duration assigned to account for this step in the event addition data is required to support a design.
11) Construction duration estimates could be impacted if electrical power upgrades are needed to support new facilities, rock is encountered during construction that would reduce daily productivity, and other unforeseen conditions that could cause delays.

## Alternative Project Phasing Plan Summary

| Alternative No. | Alternative Description | Sub-Alt ID | Sub-Alternative Description | Sub-Alternative Elements | Construction Funding Commitment [8] | Water Rights Acquisition [9] | Water Quality Data Collection [10] | Geotechnical Pre-Feasibility Screening / Evaluation | Feasibility, Project Definition, Route Study, Site Selection, Facility Siting (5%) | Preliminary Environmental Review | MOA and Land / Easement Acquisition | Surveying / Bathymetry |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | **Snake River Diversion and Pipeline to Pullman and Moscow (Project 11, Regional)** | | | | | | | | | | | |
| | | | | Water Rights | | | n/a | | | | | 3 months |
| | | | | River Intake and Pump Station | | | | | | | | |
| | | | | Conveyance Pipeline, Pump Stations, and Storage Tanks to WTP | | | n/a | | | | | 6 months |
| | | **A** | **Snake River Diversion and Conveyance to Pullman** | | 12 months | | | | | | | |
| | | | | Water Treatment Plant (WTP) | | | 12 months | | | | | 3 months |
| | | | | | | 18 months | | n/a | 4 months | 4 months | 12 months | |
| | | | | Conveyance to Pullman/WSU (pipeline) | | | n/a | | | | | 5 months |
| | | | | | | | | | | | | |
| | | | | Increase Capacity for Conveyance to WTP | 12 month | | | | | | | n/a |
| | | **B** | **Conveyance to Moscow** | Increase WTP Treatment Capacity | duration that | | n/a | | | | | n/a |
| | | | | Conveyance to Moscow/UI (pipeline, pump station) | occurs 2 years | | | | | | | 5 months |

**Notes:**

1) Contingency applied to Alternatives 1, 2, 3, 4A, 4B, and 4C is 20 percent, which is consistent with previous estimating.
2) Contingency applied to Alternative 4D is 50%, which is consistent with previous estimating.
3) Surveying costs are based on applying 0.5% to the construction cost estimate without contingency applied.
4) Geotechnical field exploration cost established by applying 1% to the construction cost estimate without contingency applied.
5) Engineering cost estimated to be 25 percent of construction cost estimate exclusive of contingency and includes design, permitting support (exclusive of environmental), bidding support, services during construction, startup and commissioning, and SCADA integration. Engineering cost shown for Alternative 3 Flannigan Creek Reservoir does not include costs associated with geotechnical field explorations, borings, and laborartory testing that would be required to support the design of the dam.
6) Environmental permitting cost estimated to be 25 percent to project design cost. Project design cost is assumed to be 10 percent of the construction cost exclusive of contingency.

7) Environmental permitting would be performed for each alternative as a whole but the cost has been applied to each sub-alternative to establish a total cost for each sub-alternative.
8) Durations for pre-construction funding and construction funding commitment are assumed.
9) Water rights acquisition duration based on professional judgement of approximated longest duration typically encountered in WA and ID.
10) Water quality data collection may not be required based on which alternative is selected to be advanced and historical data that may already be available. Activity with duration assigned to account for this step in the event addition data is required to support a design.
11) Construction duration estimates could be impacted if electrical power upgrades are needed to support new facilities, rock is encountered during construction that would reduce daily productivity, and other unforeseen conditions that could cause delays.

## Alternative Project Phasing Plan Summary

| Alternative No. | Alternative Description | Sub-Alt ID | Sub-Alternative Description | Sub-Alternative Elements | Geotechnical Field Exploration | Pre-Design (30%) | NEPA / SEPA / EID | Treatment Equipment Pre-Selection and Pilot Testing | Final Design | Permitting | Bid / Award / Contracting | Equipment / Material Manufacturing and Delivery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | **Snake River Diversion and Pipeline to Pullman and Moscow (Project 11, Regional)** | | | | | | | | | | | |
| | | | | Water Rights | 6 months | | | | | | | 4 months |
| | | | | River Intake and Pump Station | | | | n/a | 12 months | 9 months | 4 months (bid package 1) | |
| | | | | Conveyance Pipeline, Pump Stations, and Storage Tanks to WTP | 9 months | | | | | | | 6 months |
| | | **A** | **Snake River Diversion and Conveyance to Pullman** | | | | | | | | 4 months (bid | |
| | | | | Water Treatment Plant (WTP) | 6 months | | | 12 months | 12 months | 9 months | package 2) | 6 months |
| | | | | | | 6 months | 18 months | | | | 4 months (part | |
| | | | | | | | | n/a | | | of bid package | |
| | | | | Conveyance to Pullman/WSU (pipeline) | 7 months | | | | 9 months | 6 months | 1) | 4 months |
| | | | | | | | | | | | | |
| | | | | Increase Capacity for Conveyance to WTP | n/a | | | | | | | |
| | | **B** | **Conveyance to Moscow** | Increase WTP Treatment Capacity | n/a | | | n/a | 6 months | 4 months | 4 months (bid package 3) | 6 months |
| | | | | Conveyance to Moscow/UI (pipeline, pump station) | 7 months | | | | | | | |

**Notes:**

1) Contingency applied to Alternatives 1, 2, 3, 4A, 4B, and 4C is 20 percent, which is consistent with previous estimating.
2) Contingency applied to Alternative 4D is 50%, which is consistent with previous estimating.
3) Surveying costs are based on applying 0.5% to the construction cost estimate without contingency applied.
4) Geotechnical field exploration cost established by applying 1% to the construction cost estimate without contingency applied.
5) Engineering cost estimated to be 25 percent of construction cost estimate exclusive of contingency and includes design, permitting support (exclusive of environmental), bidding support, services during construction, startup and commissioning, and SCADA integration. Engineering cost shown for Alternative 3 Flannigan Creek Reservoir does not include costs associated with geotechnical field explorations, borings, and laborartory testing that would be required to support the design of the dam.
6) Environmental permitting cost estimated to be 25 percent to project design cost. Project design cost is assumed to be 10 percent of the construction cost exclusive of contingency.

7) Environmental permitting would be performed for each alternative as a whole but the cost has been applied to each sub-alternative to establish a total cost for each sub-alternative.
8) Durations for pre-construction funding and construction funding commitment are assumed.
9) Water rights acquisition duration based on professional judgement of approximated longest duration typically encountered in WA and ID.
10) Water quality data collection may not be required based on which alternative is selected to be advanced and historical data that may already be available. Activity with duration assigned to account for this step in the event addition data is required to support a design.
11) Construction duration estimates could be impacted if electrical power upgrades are needed to support new facilities, rock is encountered during construction that would reduce daily productivity, and other unforeseen conditions that could cause delays.

## Alternative Project Phasing Plan Summary

| Alternative No. | Alternative Description | Sub-Alt ID | Sub-Alternative Description | Sub-Alternative Elements | Construction Duration Estimate [11] | Construction Duration Notees |
|---|---|---|---|---|---|---|
| **1** | **Snake River Diversion and Pipeline to Pullman and Moscow (Project 11, Regional)** | | | | | |
| | | | | Water Rights | River intake - 6 months, PS - 12 months | |
| | | | | River Intake and Pump Station | | includes 4 months equipment procurement |
| | | | | Conveyance Pipeline, Pump Stations, and Storage Tanks to WTP | 12 months (assumes 2 pipeline crews and concurrent work on booster PS and tanks) | includes material procurement |
| | | **A** | **Snake River Diversion and Conveyance to Pullman** | | | |
| | | | | Water Treatment Plant (WTP) | 2 years | |
| | | | | Conveyance to Pullman/WSU (pipeline) | 3 to 6 months | includes material procurement |
| | | | | Increase Capacity for Conveyance to WTP | 3 months | |
| | | **B** | **Conveyance to Moscow** | Increase WTP Treatment Capacity | 9 months | |
| | | | | Conveyance to Moscow/UI (pipeline, pump station) | 6 to 9 months | includes material procurement |

**Notes:**

1) Contingency applied to Alternatives 1, 2, 3, 4A, 4B, and 4C is 20 percent, which is consistent with previous estimating.
2) Contingency applied to Alternative 4D is 50%, which is consistent with previous estimating.
3) Surveying costs are based on applying 0.5% to the construction cost estimate without contingency applied.
4) Geotechnical field exploration cost established by applying 1% to the construction cost estimate without contingency applied.
5) Engineering cost estimated to be 25 percent of construction cost estimate exclusive of contingency and includes design, permitting support (exclusive of environmental), bidding support, services during construction, startup and commissioning, and SCADA integration. Engineering cost shown for Alternative 3 Flannigan Creek Reservoir does not include costs associated with geotechnical field explorations, borings, and laborartory testing that would be required to support the design of the dam.
6) Environmental permitting cost estimated to be 25 percent to project design cost. Project design cost is assumed to be 10 percent of the construction cost exclusive of contingency.

7) Environmental permitting would be performed for each alternative as a whole but the cost has been applied to each sub-alternative to establish a total cost for each sub-alternative.
8) Durations for pre-construction funding and construction funding commitment are assumed.
9) Water rights acquisition duration based on professional judgement of approximated longest duration typically encountered in WA and ID.
10) Water quality data collection may not be required based on which alternative is selected to be advanced and historical data that may already be available. Activity with duration assigned to account for this step in the event addition data is required to support a design.
11) Construction duration estimates could be impacted if electrical power upgrades are needed to support new facilities, rock is encountered during construction that would reduce daily productivity, and other unforeseen conditions that could cause delays.

## Alternative Project Phasing Plan Summary

| Alternative No. | Alternative Description | Sub-Alt ID | Sub-Alternative Description | Sub-Alternative Elements | Construction Cost Estimate (Oct 2016 Dollars) | Construction Cost Estimate (Escalated to May 2021 Dollars) | Contingency [1,2] | Surveying / Bathymetry [3] | Geotechnical Field Exploration [4] | Engineering [5] | Phased Portion of Environmental Permitting [6,7] | Total Estimated Costs | Pre-Construction Funding [8] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **2** | **North Fork Palouse River Diversion (Project 8) and Pipeline to Pullman Plus Paradise Creek or South Fork Palouse Aquifer Recharge for Moscow (Project 14)** | | | | | | | | | | | | |
| | | | | Diversion Structure | $ 290,897 | $ 334,275 | | | | | | | |
| | | | | Pump Station | $ 363,622 | $ 417,845 | | | | | | | |
| | | **A** | **Paradise Creek / South Fork Palouse River Aquifer Recharge for Moscow** | Water Treatment Plant | $ 10,218,877 | $ 11,742,708 | $ 2,579,709 | $ 64,493 | $ 128,985 | $ 3,224,636 | $ 322,464 | $ 19,218,829 | 12 months |
| | | | | Recharge Well(s) | $ 351,325 | $ 403,714 | | | | | | | |
| | | **B** | **North Fork Palouse River Diversion and Pipeline to Pullman** | | | | | | | | | | |
| | | | | River Intake and Pump Station | $ 1,173,876 | $ 1,348,923 | | | | | | | |
| | | | | Conveyance to WTP | $ 4,860,829 | $ 5,585,672 | | | | | | | |
| | | **B1** | **Pullman Water Supply** | Water Treatment Plant | $ 12,838,642 | $ 14,753,131 | $ 5,859,932 | $ 146,498 | $ 292,997 | $ 7,324,914.49 | $ 732,491 | $ 43,656,490 | 12 months |
| | | | | Booster Pump Station with Storage and 1+N Pump | $ 3,109,529 | $ 3,573,219 | | | | | | | |
| | | | | Pipeline to Pullman | $ 3,244,261 | $ 3,728,043 | | | | | | | |
| | | | | Hydropower Facilty | $ 270,355 | $ 310,670 | | | | | | | |
| | | | | Increase Pumping Capacity at Intake Pump Station | $ 61,681 | $ 70,879 | | | | | | | a portion covered as part of funding above through 30% pre- |
| | | | | Increase WTP Treatment Capacity | $ 2,492,207 | $ 2,863,843 | | | | | | | |
| | | **B2** | **Moscow Water Supply** | Increase Pumping Capacity for Conveyance to Moscow | $ 180,025 | $ 206,871 | $ 1,894,268 | $ 47,357 | $ 94,713 | $ 2,367,835 | $ 236,783 | $ 14,112,296 | |
| | | | | Pipeline to Moscow | $ 5,250,230 | $ 6,033,140 | | | | | | | |
| | | | | Hydropower Facilty | $ 258,117 | $ 296,607 | | | | | | | |

**Notes:**

1) Contingency applied to Alternatives 1, 2, 3, 4A, 4B, and 4C is 20 percent, which is consistent with previous estimating.
2) Contingency applied to Alternative 4D is 50%, which is consistent with previous estimating.
3) Surveying costs are based on applying 0.5% to the construction cost estimate without contingency applied.
4) Geotechnical field exploration cost established by applying 1% to the construction cost estimate without contingency applied.
5) Engineering cost estimated to be 25 percent of construction cost estimate exclusive of contingency and includes design, permitting support (exclusive of environmental), bidding support, services during construction, startup and commissioning, and SCADA integration. Engineering cost shown for Alternative 3 Flannigan Creek Reservoir does not include costs associated with geotechnical field explorations, borings, and laborartory testing that would be required to support the design of the dam.
6) Environmental permitting cost estimated to be 25 percent to project design cost. Project design cost is assumed to be 10 percent of the construction cost exclusive of contingency.

7) Environmental permitting would be performed for each alternative as a whole but the cost has been applied to each sub-alternative to establish a total cost for each sub-alternative.
8) Durations for pre-construction funding and construction funding commitment are assumed.
9) Water rights acquisition duration based on professional judgement of approximated longest duration typically encountered in WA and ID.
10) Water quality data collection may not be required based on which alternative is selected to be advanced and historical data that may already be available. Activity with duration assigned to account for this step in the event addition data is required to support a design.
11) Construction duration estimates could be impacted if electrical power upgrades are needed to support new facilities, rock is encountered during construction that would reduce daily productivity, and other unforeseen conditions that could cause delays.

## Alternative Project Phasing Plan Summary

| Alternative No. | Alternative Description | Sub-Alt ID | Sub-Alternative Description | Sub-Alternative Elements | Construction Funding Commitment [8] | Water Rights Acquisition [9] | Water Quality Data Collection [10] | Geotechnical Pre-Feasibility Screening / Evaluation | Feasibility, Project Definition, Route Study, Site Selection, Facility Siting (5%) | Preliminary Environmental Review | MOA and Land / Easement Acquisition | Surveying / Bathymetry |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **2** | **North Fork Palouse River Diversion (Project 8) and Pipeline to Pullman Plus Paradise Creek or South Fork Palouse Aquifer Recharge for Moscow (Project 14)** | | | | | | | | | | | |
| | | | | Diversion Structure | | | n/a | | | | | |
| | | | | Pump Station | | | n/a | | | | | |
| | | **A** | **Paradise Creek / South Fork Palouse River Aquifer Recharge for Moscow** | Water Treatment Plant | 12 months | 18 months | 12 months | n/a | 4 months | 4 months | 12 months | 2 months |
| | | | | Recharge Well(s) | | | n/a | | | | | |
| | | | | | | | | | | | | |
| | | **B** | **North Fork Palouse River Diversion and Pipeline to Pullman** | | | | | | | | | |
| | | | | River Intake and Pump Station | | | n/a | | | | | 3 months |
| | | | | Conveyance to WTP | | | n/a | | | | | 5 months |
| | | **B1** | **Pullman Water Supply** | Water Treatment Plant | 12 months | | 12 months | n/a | 4 months | 4 months | 12 months | 3 months |
| | | | | Booster Pump Station with Storage and 1+N Pump | | | n/a | | | | | 2 months |
| | | | | Pipeline to Pullman | | 18 months | n/a | | | | | 5 months |
| | | | | Hydropower Facilty | | | n/a | | | | | 2 months |
| | | | | Increase Pumping Capacity at Intake Pump Station | a portion | | n/a | | | | | n/a |
| | | | | Increase WTP Treatment Capacity | covered as part | | n/a | | | | | n/a |
| | | **B2** | **Moscow Water Supply** | Increase Pumping Capacity for Conveyance to Moscow | of funding above | | n/a | n/a | 4 months | 4 months | 12 months | n/a |
| | | | | Pipeline to Moscow | through 30% pre- | | n/a | | | | | 5 months |
| | | | | Hydropower Facilty | design; another | | n/a | | | | | 2 months |

**Notes:**

1) Contingency applied to Alternatives 1, 2, 3, 4A, 4B, and 4C is 20 percent, which is consistent with previous estimating.
2) Contingency applied to Alternative 4D is 50%, which is consistent with previous estimating.
3) Surveying costs are based on applying 0.5% to the construction cost estimate without contingency applied.
4) Geotechnical field exploration cost established by applying 1% to the construction cost estimate without contingency applied.
5) Engineering cost estimated to be 25 percent of construction cost estimate exclusive of contingency and includes design, permitting support (exclusive of environmental), bidding support, services during construction, startup and commissioning, and SCADA integration. Engineering cost shown for Alternative 3 Flannigan Creek Reservoir does not include costs associated with geotechnical field explorations, borings, and laborartory testing that would be required to support the design of the dam.
6) Environmental permitting cost estimated to be 25 percent to project design cost. Project design cost is assumed to be 10 percent of the construction cost exclusive of contingency.

7) Environmental permitting would be performed for each alternative as a whole but the cost has been applied to each sub-alternative to establish a total cost for each sub-alternative.
8) Durations for pre-construction funding and construction funding commitment are assumed.
9) Water rights acquisition duration based on professional judgement of approximated longest duration typically encountered in WA and ID.
10) Water quality data collection may not be required based on which alternative is selected to be advanced and historical data that may already be available. Activity with duration assigned to account for this step in the event addition data is required to support a design.
11) Construction duration estimates could be impacted if electrical power upgrades are needed to support new facilities, rock is encountered during construction that would reduce daily productivity, and other unforeseen conditions that could cause delays.

## Alternative Project Phasing Plan Summary

| Alternative No. | Alternative Description | Sub-Alt ID | Sub-Alternative Description | Sub-Alternative Elements | Geotechnical Field Exploration | Pre-Design (30%) | NEPA / SEPA / EID | Treatment Equipment Pre-Selection and Pilot Testing | Final Design | Permitting | Bid / Award / Contracting | Equipment / Material Manufacturing and Delivery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **2** | **North Fork Palouse River Diversion (Project 8) and Pipeline to Pullman Plus Paradise Creek or South Fork Palouse Aquifer Recharge for Moscow (Project 14)** | | | | | | | | | | | |
| | | **A** | **Paradise Creek / South Fork Palouse River Aquifer Recharge for Moscow** | Diversion Structure | | | | n/a | 6 months | | 4 months (bid package A1) | 3 months |
| | | | | Pump Station | | | | n/a | 6 months | | | 4 months |
| | | | | Water Treatment Plant | 6 months | 6 months | 18 months | 12 months | 9 months | 9 months | 4 months (bid package A2) | 6 months |
| | | | | Recharge Well(s) | | | | n/a | 6 months | | 4 months (bid package A1) | |
| | | | | | | | | | | | | |
| | | **B** | **North Fork Palouse River Diversion and Pipeline to Pullman** | | | | | | | | | |
| | | | | River Intake and Pump Station | 6 months | | | n/a | 12 months | 9 months | 4 months (bid package B1) | 4 months |
| | | | | Conveyance to WTP | 7 months | | | | | | | |
| | | **B1** | **Pullman Water Supply** | Water Treatment Plant | 6 months | | | 12 months | 12 months | 9 months | 4 months (bid package B2) | 6 months |
| | | | | Booster Pump Station with Storage and 1+N Pump | 4 months | | | | | | | |
| | | | | Pipeline to Pullman | 7 months | 6 months | 18 months | | 12 months | 6 months | 4 months (bid package B1) | 6 months |
| | | | | Hydropower Facilty | | | | | | | | |
| | | | | Increase Pumping Capacity at Intake Pump Station | n/a | | | n/a | | | | |
| | | | | Increase WTP Treatment Capacity | n/a | | | | | | | |
| | | **B2** | **Moscow Water Supply** | Increase Pumping Capacity for Conveyance to Moscow | n/a | | | | 9 months | 4 months | 4 months (bid package B3) | 6 months |
| | | | | Pipeline to Moscow | 7 months | | | | | | | |
| | | | | Hydropower Facilty | | | | | | | | |

**Notes:**

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2) Contingency applied to Alternative 4D is 50%, which is consistent with previous estimating.
3) Surveying costs are based on applying 0.5% to the construction cost estimate without contingency applied.
4) Geotechnical field exploration cost established by applying 1% to the construction cost estimate without contingency applied.
5) Engineering cost estimated to be 25 percent of construction cost estimate exclusive of contingency and includes design, permitting support (exclusive of environmental), bidding support, services during construction, startup and commissioning, and SCADA integration. Engineering cost shown for Alternative 3 Flannigan Creek Reservoir does not include costs associated with geotechnical field explorations, borings, and laborartory testing that would be required to support the design of the dam.
6) Environmental permitting cost estimated to be 25 percent to project design cost. Project design cost is assumed to be 10 percent of the construction cost exclusive of contingency.

7) Environmental permitting would be performed for each alternative as a whole but the cost has been applied to each sub-alternative to establish a total cost for each sub-alternative.
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9) Water rights acquisition duration based on professional judgement of approximated longest duration typically encountered in WA and ID.
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11) Construction duration estimates could be impacted if electrical power upgrades are needed to support new facilities, rock is encountered during construction that would reduce daily productivity, and other unforeseen conditions that could cause delays.

## Alternative Project Phasing Plan Summary

| Alternative No. | Alternative Description | Sub-Alt ID | Sub-Alternative Description | Sub-Alternative Elements | Construction Duration Estimate [11] | Construction Duration Notees |
|---|---|---|---|---|---|---|
| **2** | **North Fork Palouse River Diversion (Project 8) and Pipeline to Pullman Plus Paradise Creek or South Fork Palouse Aquifer Recharge for Moscow (Project 14)** | | | | | |
| | | | | Diversion Structure | 6 months | |
| | | | | Pump Station | 9 months | includes 4 months equipment procurement |
| | | **A** | **Paradise Creek / South Fork Palouse River Aquifer Recharge for Moscow** | Water Treatment Plant | 2 years | |
| | | | | Recharge Well(s) | 3 to 6 months | |
| | | **B** | **North Fork Palouse River Diversion and Pipeline to Pullman** | | | |
| | | | | River Intake and Pump Station | River intake - 6 months, PS - 9 months | includes 4 months equipment procurement |
| | | | | Conveyance to WTP | 6 months | includes material procurement |
| | | **B1** | **Pullman Water Supply** | Water Treatment Plant | 2 years | |
| | | | | Booster Pump Station with Storage and 1+N Pump | 9 months | longer duration to account 1M gallon bolted steel storage tank |
| | | | | Pipeline to Pullman | 7 months | includes material procurement |
| | | | | Hydropower Facilty | 9 months | includes 6 month equipment procurement |
| | | | | Increase Pumping Capacity at Intake Pump Station | 6 months | includes 4 months equipment procurement |
| | | | | Increase WTP Treatment Capacity | 9 months | includes 6 months for equipment procurement |
| | | **B2** | **Moscow Water Supply** | Increase Pumping Capacity for Conveyance to Moscow | 6 months | includes 4 months equipment procurement |
| | | | | Pipeline to Moscow | 8 months | includes material procurement |
| | | | | Hydropower Facilty | 9 months | includes 6 month equipment procurement |

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3) Surveying costs are based on applying 0.5% to the construction cost estimate without contingency applied.
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## Alternative Project Phasing Plan Summary

| Alternative No. | Alternative Description | Sub-Alt ID | Sub-Alternative Description | Sub-Alternative Elements | Construction Cost Estimate (Oct 2016 Dollars) | Construction Cost Estimate (Escalated to May 2021 Dollars) | Contingency [1,2] | Surveying / Bathymetry [3] | Geotechnical Field Exploration [4] | Engineering [5] | Phased Portion of Environmental Permitting [6,7] | Total Estimated Costs | Pre-Construction Funding [8] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **3** | **Flannigan Creek Storage, Conveyance, and Treatment to Moscow/UI (Project 1) plus South Fork Palouse River Direct Diversion for Pullman/WSU (Project 16)** | | | | | | | | | | | | |
| | | | | River Intake and Pump Station | $ 1,177,102 | $ 1,352,631 | | | | | | | |
| | | | | Conveyance to WTP | $ 262,723 | $ 301,900 | | | | | | | |
| | | **A** | **South Fork Palouse River Direct Diversion for Pullman/WSU** | Water Treatment Plant | $ 15,104,285 | $ 17,356,624 | $ 3,862,611 | $ 96,565 | $ 193,131 | $ 4,828,264 | $ 482,826 | $ 28,776,452 | 12 months |
| | | | | Pipeline(s) to Pullman and WSU | $ 262,723 | $ 301,900 | | | | | | | |
| | | | | Flannigan Creek Reservoir and Outlet Works | $ 13,011,500 | $ 14,951,765 | | | | | | | |
| | | **B** | **Flannigan Creek Storage, Conveyance, and Treatment to Moscow/UI** | Conveyance to WTP (pipeline, two pump stations, storage tank) | $ 13,192,669 | $ 15,159,950 | $ 10,233,529 | $ 255,838 | $ 511,676 | $ 12,791,911 | $ 1,279,191 | $ 76,239,792 | 12 months |
| | | | | Hydropower Facility | $ 543,383 | $ 624,412 | | | | | | | |
| | | | | Water Treatment Plant | $ 17,282,855 | $ 19,860,061 | | | | | | | |
| | | | | Conveyance to Moscow and UI | $ 497,301 | $ 571,458 | | | | | | | |

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## Alternative Project Phasing Plan Summary

| Alternative No. | Alternative Description | Sub-Alt ID | Sub-Alternative Description | Sub-Alternative Elements | Construction Funding Commitment [8] | Water Rights Acquisition [9] | Water Quality Data Collection [10] | Geotechnical Pre-Feasibility Screening / Evaluation | Feasibility, Project Definition, Route Study, Site Selection, Facility Siting (5%) | Preliminary Environmental Review | MOA and Land / Easement Acquisition | Surveying / Bathymetry |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **3** | **Flannigan Creek Storage, Conveyance, and Treatment to Moscow/UI (Project 1) plus South Fork Palouse River Direct Diversion for Pullman/WSU (Project 16)** | | | | | | | | | | | |
| | | **A** | **South Fork Palouse River Direct Diversion for Pullman/WSU** | River Intake and Pump Station | 12 months | 18 months | n/a | n/a | 4 months | 4 months | 12 months | 3 months |
| | | | | Conveyance to WTP | | | n/a | | | | | |
| | | | | Water Treatment Plant | | | 12 months | | | | | |
| | | | | Pipeline(s) to Pullman and WSU | | | n/a | | | | | |
| | | | | | | | | | | | | |
| | | **B** | **Flannigan Creek Storage, Conveyance, and Treatment to Moscow/UI** | Flannigan Creek Reservoir and Outlet Works | 12 months | 18 months | n/a | 3 months | 6 months | 4 months | 12 months | 6 months |
| | | | | Conveyance to WTP (pipeline, two pump stations, storage tank) | | | n/a | n/a | 4 months | | | 6 months |
| | | | | Hydropower Facility | | | n/a | | | | | |
| | | | | Water Treatment Plant | | | 12 months | | | | | |
| | | | | Conveyance to Moscow and UI | | | n/a | | | | | |

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## Alternative Project Phasing Plan Summary

| Alternative No. | Alternative Description | Sub-Alt ID | Sub-Alternative Description | Sub-Alternative Elements | Geotechnical Field Exploration | Pre-Design (30%) | NEPA / SEPA / EID | Treatment Equipment Pre-Selection and Pilot Testing | Final Design | Permitting | Bid / Award / Contracting | Equipment / Material Manufacturing and Delivery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **3** | **Flannigan Creek Storage, Conveyance, and Treatment to Moscow/UI (Project 1) plus South Fork Palouse River Direct Diversion for Pullman/WSU (Project 16)** | | | | | | | | | | | |
| | | **A** | **South Fork Palouse River Direct Diversion for Pullman/WSU** | River Intake and Pump Station | 6 months | 6 months | 18 months | n/a | 12 months | 9 months | 4 months (bid package A1) | 4 months |
| | | | | Conveyance to WTP | | | | 12 months | | 9 months | 4 months (bid package A2) | 6 months |
| | | | | Water Treatment Plant | | | | n/a | | 6 months | 4 months (bid package A1) | n/a |
| | | | | Pipeline(s) to Pullman and WSU | | | | | | | | |
| | | **B** | **Flannigan Creek Storage, Conveyance, and Treatment to Moscow/UI** | Flannigan Creek Reservoir and Outlet Works | 7 months | 6 months | 18 months | n/a | 12 months | 2 years | 4 months (bid package B1) | 6 months |
| | | | | Conveyance to WTP (pipeline, two pump stations, storage tank) | | | | | | 6 months | 4 months (bid package B2) | 4 months |
| | | | | Hydropower Facility | 7 months | | | | | | | |
| | | | | Water Treatment Plant | | | | 12 months | | 9 months | 4 months (bid package B3) | 6 months |
| | | | | Conveyance to Moscow and UI | | | | n/a | | 6 months | | n/a |

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## Alternative Project Phasing Plan Summary

| Alternative No. | Alternative Description | Sub-Alt ID | Sub-Alternative Description | Sub-Alternative Elements | Construction Duration Estimate [11] | Construction Duration Notees |
|---|---|---|---|---|---|---|
| **3** | **Flannigan Creek Storage, Conveyance, and Treatment to Moscow/UI (Project 1) plus South Fork Palouse River Direct Diversion for Pullman/WSU (Project 16)** | | | | | |
| | | **A** | **South Fork Palouse River Direct Diversion for Pullman/WSU** | River Intake and Pump Station | River intake - 6 months, PS - 9 months | includes 4 months equipment procurement |
| | | | | Conveyance to WTP | 2 months | includes material procurement |
| | | | | Water Treatment Plant | 2 years | |
| | | | | Pipeline(s) to Pullman and WSU | 2 months | includes material procurement |
| | | | | | | |
| | | **B** | **Flannigan Creek Storage, Conveyance, and Treatment to Moscow/UI** | Flannigan Creek Reservoir and Outlet Works | 24 months | |
| | | | | Conveyance to WTP (pipeline, two pump stations, storage tank) | 9 months for pipeline, 9 months for each PS concurrently, 6 months for storage tank | |
| | | | | Hydropower Facility | 9 months | includes 6 month equipment procurement |
| | | | | Water Treatment Plant | 2 years | |
| | | | | Conveyance to Moscow and UI | 2 months | includes material procurement |

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## Alternative Project Phasing Plan Summary

| Alternative No. | Alternative Description | Sub-Alt ID | Sub-Alternative Description | Sub-Alternative Elements | Construction Cost Estimate (Oct 2016 Dollars) | Construction Cost Estimate (Escalated to May 2021 Dollars) | Contingency [1,2] | Surveying / Bathymetry [3] | Geotechnical Field Exploration [4] | Engineering [5] | Phased Portion of Environmental Permitting [6,7] | Total Estimated Costs | Pre-Construction Funding [8] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **4** | **Paradise Creek Aquifer Recharge, South Fork Palouse ASR, Pullman Wastewater Reuse (20), and Moscow Water Reuse and Passive Groundwater Recharge (35) plus Additional Conversation** | | | | | | | | | | | | |
| | | **A** | **South Fork Palouse River Diversion for ASR in Pullman** | River Intake and Pump Station | $ 654,636 | $ 752,255 | | | | | | | |
| | | | | Water Treatment Plant | $ 10,218,877 | $ 11,742,708 | $ 2,579,735 | $ 64,493 | $ 128,987 | $ 3,224,669 | $ 322,467 | $ 19,219,029 | 12 months |
| | | | | ASR Well | $ 351,325 | $ 403,714 | | | | | | | |
| | | **B** | **Paradise Creek Diversion for Aquifer Recharge in Moscow** | River Intake and Pump Station | $ 654,636 | $ 752,255 | | | | | | | |
| | | | | Water Treatment Plant | $ 10,218,877 | $ 11,742,708 | $ 2,579,735 | $ 64,493 | $ 128,987 | $ 3,224,669 | $ 322,467 | $ 19,219,029 | 12 months |
| | | | | ASR Well | $ 351,325 | $ 403,714 | | | | | | | |
| | | **C** | **Wastewater Reuse in Pullman** | Pullman WWTP Upgrades | $ 4,972,814 | $ 5,714,356 | | | | | | | |
| | | | | Reclaimed Water Pump Station | $ 515,284 | $ 592,123 | | | | | | | |
| | | | | Conveyance Pipeline to Storage Tank | $ 3,295,446 | $ 3,786,860 | | | | | | | |
| | | | | Reclaimed Water Storage Tank | $ 19,253,089 | $ 22,124,094 | $ 7,117,119 | $ 177,928 | $ 355,856 | $ 8,896,399 | $ 889,640 | $ 53,022,538 | 12 months |
| | | | | Distribution System Pipelines to Site in Pullman and WSU | $ 595,056 | $ 683,790 | | | | | | | |
| | | | | Electrical & Controls | $ 1,096,326 | $ 1,259,809 | | | | | | | |
| | | | | Mobilization and Bonds (10%) | $ 1,239,700 | $ 1,424,563 | | | | | | | |
| | | **D** | **Wastewater Reuse for Groundwater Recharge in Moscow** | Moscow WWTP Upgrades | $ 1,492,000 | $ 1,714,486 | | | | | | | |
| | | | | Pump Station and Conveyance Pipeline (1,000 LF of 12-in HDPE) | $ 177,000 | $ 203,394 | $ 1,142,225 | $ 11,422 | $ 22,844 | $ 571,112 | $ 57,111 | $ 4,089,164 | 12 months |
| | | | | Infiltration Basins (42,680 SF) | $ 319,000 | $ 366,569 | | | | | | | |
| | | **E** | **Additional Conservation** | Additional Conservation Measures | $ 18,690,000 | $ 21,477,038 | $ 4,295,408 | assume not required | assume not required | assume not required | assume not required | $ 25,772,446 | |

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## Alternative Project Phasing Plan Summary

| Alternative No. | Alternative Description | Sub-Alt ID | Sub-Alternative Description | Sub-Alternative Elements | Construction Funding Commitment [8] | Water Rights Acquisition [9] | Water Quality Data Collection [10] | Geotechnical Pre-Feasibility Screening / Evaluation | Feasibility, Project Definition, Route Study, Site Selection, Facility Siting (5%) | Preliminary Environmental Review | MOA and Land / Easement Acquisition | Surveying / Bathymetry |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **4** | **Paradise Creek Aquifer Recharge, South Fork Palouse ASR, Pullman Wastewater Reuse (20), and Moscow Water Reuse and Passive Groundwater Recharge (35) plus Additional Conversation** | | | | | | | | | | | |
| | | **A** | **South Fork Palouse River Diversion for ASR in Pullman** | River Intake and Pump Station<br>Water Treatment Plant<br>ASR Well | 12 months | 18 months | n/a<br>12 months<br>n/a | n/a | 4 months | 4 months | 12 months | 3 months |
| | | **B** | **Paradise Creek Diversion for Aquifer Recharge in Moscow** | River Intake and Pump Station<br>Water Treatment Plant<br>ASR Well | 12 months | 18 months | n/a<br>12 months<br>n/a | n/a | 4 months | 4 months | 12 months | 3 months |
| | | **C** | **Wastewater Reuse in Pullman** | Pullman WWTP Upgrades<br>Reclaimed Water Pump Station<br>Conveyance Pipeline to Storage Tank<br>Reclaimed Water Storage Tank<br>Distribution System Pipelines to Site in Pullman and WSU<br>Electrical & Controls<br>Mobilization and Bonds (10%) | 12 months | n/a | n/a | n/a | 4 months | 4 months | n/a<br>12 months | n/a<br>6 months |
| | | **D** | **Wastewater Reuse for Groundwater Recharge in Moscow** | Moscow WWTP Upgrades<br>Pump Station and Conveyance Pipeline (1,000 LF of 12-in HDPE)<br>Infiltration Basins (42,680 SF) | 12 months | n/a | n/a | n/a | 4 months | 4 months | 12 months | n/a<br>4 months |
| | | **E** | **Additional Conservation** | Additional Conservation Measures | | | n/a | n/a | n/a | n/a | n/a | n/a |

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3) Surveying costs are based on applying 0.5% to the construction cost estimate without contingency applied.
4) Geotechnical field exploration cost established by applying 1% to the construction cost estimate without contingency applied.
5) Engineering cost estimated to be 25 percent of construction cost estimate exclusive of contingency and includes design, permitting support (exclusive of environmental), bidding support, services during construction, startup and commissioning, and SCADA integration. Engineering cost shown for Alternative 3 Flannigan Creek Reservoir does not include costs associated with geotechnical field explorations, borings, and laborartory testing that would be required to support the design of the dam.
6) Environmental permitting cost estimated to be 25 percent to project design cost. Project design cost is assumed to be 10 percent of the construction cost exclusive of contingency.

7) Environmental permitting would be performed for each alternative as a whole but the cost has been applied to each sub-alternative to establish a total cost for each sub-alternative.
8) Durations for pre-construction funding and construction funding commitment are assumed.
9) Water rights acquisition duration based on professional judgement of approximated longest duration typically encountered in WA and ID.
10) Water quality data collection may not be required based on which alternative is selected to be advanced and historical data that may already be available. Activity with duration assigned to account for this step in the event addition data is required to support a design.
11) Construction duration estimates could be impacted if electrical power upgrades are needed to support new facilities, rock is encountered during construction that would reduce daily productivity, and other unforeseen conditions that could cause delays.

## Alternative Project Phasing Plan Summary

| Alternative No. | Alternative Description | Sub-Alt ID | Sub-Alternative Description | Sub-Alternative Elements | Geotechnical Field Exploration | Pre-Design (30%) | NEPA / SEPA / EID | Treatment Equipment Pre-Selection and Pilot Testing | Final Design | Permitting | Bid / Award / Contracting | Equipment / Material Manufacturing and Delivery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **4** | **Paradise Creek Aquifer Recharge, South Fork Palouse ASR, Pullman Wastewater Reuse (20), and Moscow Water Reuse and Passive Groundwater Recharge (35) plus Additional Conversation** | | | | | | | | | | | |
| | | **A** | **South Fork Palouse River Diversion for ASR in Pullman** | River Intake and Pump Station<br>Water Treatment Plant<br>ASR Well | 6 months | 6 months | 18 months | n/a<br>12 months<br>n/a | 12 months | 9 months | 4 months (bid package 3) | 4 months<br>6 months<br>3 months |
| | | **B** | **Paradise Creek Diversion for Aquifer Recharge in Moscow** | River Intake and Pump Station<br>Water Treatment Plant<br>ASR Well | 6 months | 6 months | 18 months | n/a<br>12 months<br>n/a | 12 months | 9 months | 4 months (bid package 2) | 4 months<br>6 months<br>3 months |
| | | **C** | **Wastewater Reuse in Pullman** | Pullman WWTP Upgrades<br>Reclaimed Water Pump Station<br>Conveyance Pipeline to Storage Tank<br>Reclaimed Water Storage Tank<br>Distribution System Pipelines to Site in Pullman and WSU<br>Electrical & Controls<br>Mobilization and Bonds (10%) | n/a<br>7 months | 6 months | 18 months | n/a | 12 months | 6 months | 4 months (bid package 4) | 6 months<br>6 months<br>n/a<br>6 months<br>n/a<br>n/a<br>n/a |
| | | **D** | **Wastewater Reuse for Groundwater Recharge in Moscow** | Moscow WWTP Upgrades<br>Pump Station and Conveyance Pipeline (1,000 LF of 12-in HDPE)<br>Infiltration Basins (42,680 SF) | n/a<br>3 months<br>12 months | 6 months | 18 months | n/a | 12 months | 9 months | 4 months (bid package 1) | 6 months<br>4 months<br>n/a |
| | | **E** | **Additional Conservation** | Additional Conservation Measures | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |

**Notes:**

1) Contingency applied to Alternatives 1, 2, 3, 4A, 4B, and 4C is 20 percent, which is consistent with previous estimating.
2) Contingency applied to Alternative 4D is 50%, which is consistent with previous estimating.
3) Surveying costs are based on applying 0.5% to the construction cost estimate without contingency applied.
4) Geotechnical field exploration cost established by applying 1% to the construction cost estimate without contingency applied.
5) Engineering cost estimated to be 25 percent of construction cost estimate exclusive of contingency and includes design, permitting support (exclusive of environmental), bidding support, services during construction, startup and commissioning, and SCADA integration. Engineering cost shown for Alternative 3 Flannigan Creek Reservoir does not include costs associated with geotechnical field explorations, borings, and laborartory testing that would be required to support the design of the dam.
6) Environmental permitting cost estimated to be 25 percent to project design cost. Project design cost is assumed to be 10 percent of the construction cost exclusive of contingency.

7) Environmental permitting would be performed for each alternative as a whole but the cost has been applied to each sub-alternative to establish a total cost for each sub-alternative.
8) Durations for pre-construction funding and construction funding commitment are assumed.
9) Water rights acquisition duration based on professional judgement of approximated longest duration typically encountered in WA and ID.
10) Water quality data collection may not be required based on which alternative is selected to be advanced and historical data that may already be available. Activity with duration assigned to account for this step in the event addition data is required to support a design.
11) Construction duration estimates could be impacted if electrical power upgrades are needed to support new facilities, rock is encountered during construction that would reduce daily productivity, and other unforeseen conditions that could cause delays.

## Alternative Project Phasing Plan Summary

| Alternative No. | Alternative Description | Sub-Alt ID | Sub-Alternative Description | Sub-Alternative Elements | Construction Duration Estimate [11] | Construction Duration Notees |
|---|---|---|---|---|---|---|
| **4** | **Paradise Creek Aquifer Recharge, South Fork Palouse ASR, Pullman Wastewater Reuse (20), and Moscow Water Reuse and Passive Groundwater Recharge (35) plus Additional Conversation** | | | | | |
| | | **A** | **South Fork Palouse River Diversion for ASR in Pullman** | River Intake and Pump Station<br>Water Treatment Plant<br>ASR Well | River intake - 6 months, PS - 9 months<br>2 years<br>3 to 6 months | includes 4 months equipment procurement |
| | | **B** | **Paradise Creek Diversion for Aquifer Recharge in Moscow** | River Intake and Pump Station<br>Water Treatment Plant<br>ASR Well | River intake - 6 months, PS - 9 months<br>2 years<br>3 to 6 months | includes 4 months equipment procurement |
| | | **C** | **Wastewater Reuse in Pullman** | Pullman WWTP Upgrades<br>Reclaimed Water Pump Station<br>Conveyance Pipeline to Storage Tank<br>Reclaimed Water Storage Tank<br>Distribution System Pipelines to Site in Pullman and WSU<br>Electrical & Controls<br>Mobilization and Bonds (10%) | 9 months<br>9 months<br>2 months<br>6 months<br>2 months<br>2 to 9 months<br>n/a | includes 6 months for equipment procurement<br>includes 4 months equipment procurement<br>includes material procurement<br><br>includes material procurement<br>performed in conjunction with other construction line items |
| | | **D** | **Wastewater Reuse for Groundwater Recharge in Moscow** | Moscow WWTP Upgrades<br>Pump Station and Conveyance Pipeline (1,000 LF of 12-in HDPE)<br>Infiltration Basins (42,680 SF) | 9 months<br>9 months<br>3 months | includes 6 months for equipment procurement<br>includes 4 months equipment procurement |
| | | **E** | **Additional Conservation** | Additional Conservation Measures | 5 years | |

**Notes:**

1) Contingency applied to Alternatives 1, 2, 3, 4A, 4B, and 4C is 20 percent, which is consistent with previous estimating.
2) Contingency applied to Alternative 4D is 50%, which is consistent with previous estimating.
3) Surveying costs are based on applying 0.5% to the construction cost estimate without contingency applied.
4) Geotechnical field exploration cost established by applying 1% to the construction cost estimate without contingency applied.
5) Engineering cost estimated to be 25 percent of construction cost estimate exclusive of contingency and includes design, permitting support (exclusive of environmental), bidding support, services during construction, startup and commissioning, and SCADA integration. Engineering cost shown for Alternative 3 Flannigan Creek Reservoir does not include costs associated with geotechnical field explorations, borings, and laborartory testing that would be required to support the design of the dam.
6) Environmental permitting cost estimated to be 25 percent to project design cost. Project design cost is assumed to be 10 percent of the construction cost exclusive of contingency.

7) Environmental permitting would be performed for each alternative as a whole but the cost has been applied to each sub-alternative to establish a total cost for each sub-alternative.
8) Durations for pre-construction funding and construction funding commitment are assumed.
9) Water rights acquisition duration based on professional judgement of approximated longest duration typically encountered in WA and ID.
10) Water quality data collection may not be required based on which alternative is selected to be advanced and historical data that may already be available. Activity with duration assigned to account for this step in the event addition data is required to support a design.
11) Construction duration estimates could be impacted if electrical power upgrades are needed to support new facilities, rock is encountered during construction that would reduce daily productivity, and other unforeseen conditions that could cause delays.

# Attachment 2
# Phased Alternative Project Implementation Schedules

| ID | Task Name |
|---|---|
| 1 | Alternative 1 - Snake River Diversion and Pipeline to Pullman and Moscow |
| 2 | Pre-Construction Funding |
| 3 | Construction Funding Commitment |
| 4 | Water Rights Acquisition |
| 5 | Water Quality Data Collection (For WTP) |
| 6 | Feasibility, Project Definition, Route Study, Site Selection, Facility Siting (5%) |
| 7 | Preliminary Environmental Review |
| 8 | MOA and Land/Easement Acquisition |
| 9 | Surveying/Bathymetry and Geotechnical Field Exploration |
| 10 | Preliminary Design (30%) |
| 11 | NEPA/SEPA/EID |
| 12 | Alternative 1A - Snake River Diversion and Conveyance to Pullman |
| 13 | Secure Final Funding |
| 14 | Bid Package 1 (River Intake/PS, Conveyance and Storage to WTP, Conveyance to Pullman/WSU) |
| 15 | Final Design |
| 16 | Permitting |
| 17 | Bid/Award/Contracting |
| 18 | Equipment/Material Manufacturing and Delivery |
| 19 | Construction |
| 20 | Bid Package 2 (Water Treatment Plant) |
| 21 | Treatment Equipment Pre-Selection and Pilot Testing (For WTP) |
| 22 | Final Design |
| 23 | Permitting |
| 24 | Bid/Award/Contracting |
| 25 | Equipment/Material Manufacturing and Delivery |
| 26 | Construction |
| 27 | Alternative 1B - Conveyance to Moscow |
| 28 | Secure Final Funding |
| 29 | Bid Package 3 (Increase Conveyance/WTP capacity, Conveyance to Moscow/UI) |
| 30 | Final Design |
| 31 | Permitting |
| 32 | Bid/Award/Contracting |
| 33 | Equipment/Material Manufacturing and Delivery |
| 34 | Construction |

| ID | | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | Alternative 2 - North Fork Palouse River Diversion (Project 8) and Pipeline to Pullman Plus Paradise Creek or S | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | | Pre-Construction Funding | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | | Construction Funding Commitment | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | | Water Rights Acquisition | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | | Water Quality Data Collection | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | | Feasibility, Project Definition, Route Study, Site Selection, Facility Siting (5%) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | | Preliminary Environmental Review | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | | MOA and Land/Easement Acquisition | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | | Surveying/Bathymetry and Geotechnical Field Exploration | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | Preliminary Design (30%) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | | NEPA/SEPA/EID | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | | Alternative 2A - Paradise Creek / South Fork Palouse River Aquifer Recharge for Moscow | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | | Secure Final Funding | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | | Bid Package A1 (Diversion Structure, Pump Station, Recharge Well(s)) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | | Final Design | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | | Permitting | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | | Bid/Award/Contracting | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 | | Equipment/Material Manufacturing and Delivery | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19 | | Construction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | | Bid Package A2 (Water Treatment Plant) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | | Treatment Equipment Pre-Selection and Pilot Testing | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 | | Final Design | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23 | | Permitting | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 | | Bid/Award/Contracting | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25 | | Equipment/Material Manufacturing and Delivery | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 | | Construction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Project: Palouse GW Basin Alter
Date: Thu 7/1/21

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| Task | Project Summary | Manual Task | Start-only | Deadline | | | |
| Split | Inactive Task | Duration-only | Finish-only | Progress | | | |
| Milestone | Inactive Milestone | Manual Summary Rollup | External Tasks | Manual Progress | | | |
| Summary | Inactive Summary | Manual Summary | External Milestone | | | | |

| ID | | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 |
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Alternative 2B - North Fork Palouse River Diversion and Pileline to Pullman
Alternative 2B1 - Pullman Water Supply
Secure Final Funding
Bid Package B1 (River Intake/PS, Conveyance to WTP, Booster PS/Storage, Pipeline to Pullman, Hydropower F
Final Design
Permitting
Bid/Award/Contracting
Equipment/Material Manufacturing and Delivery
Construction
Bid Package B2 (Water Treatment Plant)
Treatment Equipment Pre-Selection and Pilot Testing
Final Design
Permitting
Bid/Award/Contracting
Equipment/Material Manufacturing and Delivery
Construction
Alternative 2B2 - Moscow Water Supply
Secure Final Funding
Bid Package B3 (Pumping Capacity at Intake PS, Increase WTP Capacity, Increase Conveyance Pumping Capacity, Pipeline to Moscow
Final Design
Permitting
Bid/Award/Contracting
Equipment/Material Manufacturing and Delivery
Construction

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Date: Thu 7/1/21

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| Task | Project Summary | Manual Task | Start-only | Deadline | | | |
| Split | Inactive Task | Duration-only | Finish-only | Progress | | | |
| Milestone | Inactive Milestone | Manual Summary Rollup | External Tasks | Manual Progress | | | |
| Summary | Inactive Summary | Manual Summary | External Milestone | | | | |

| ID | | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | Alternative 3 - Flannigan Creek Storage, Conveyance, and Treatment to Moscow/UI (Project 1) plus South For | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | | Pre-Construction Funding | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | | Construction Funding Commitment | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | | Water Rights Acquisition | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | | Water Quality Data Collection | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | | Feasibility, Project Definition, Route Study, Site Selection, Facility Siting (5%) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | | Preliminary Environmental Review | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | | MOA and Land/Easement Acquisition | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | | Surveying/Bathymetry and Geotechnical Field Exploration | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | Preliminary Design (30%) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | | NEPA/SEPA/EID | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | | Alternative 3A - South Fork Palouse River Direct Diversion for Pullman/WSU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | | Secure Final Funding | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | | Bid Package A1 (River Intake/PS, Conveyance to WTP, Pipeline(s) to Pullman and WSU) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | | Final Design | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | | Permitting | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | | Bid/Award/Contracting | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 | | Equipment/Material Manufacturing and Delivery | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19 | | Construction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | | Bid Package A2 (Water Treatment Plant) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | | Treatment Equipment Pre-Selection and Pilot Testing | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 | | Final Design | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23 | | Permitting | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 | | Bid/Award/Contracting | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Project: Palouse GW Basin Alter
Date: Thu 7/1/21

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| Task | Project Summary | Manual Task | Start-only | Deadline | | | |
| Split | Inactive Task | Duration-only | Finish-only | Progress | | | |
| Milestone | Inactive Milestone | Manual Summary Rollup | External Tasks | Manual Progress | | | |
| Summary | Inactive Summary | Manual Summary | External Milestone | | | | |

| ID | | Task Name |
|---|---|---|
| 25 | | Equipment/Material Manufacturing and Delivery |
| 26 | | Construction |
| 27 | | Alternative 3B - Flannigan Creek Storage, Conveyance, and Treatment to Moscow/UI |
| 28 | | Secure Final Funding |
| 29 | | Bid Package B1 (Flannigan Creek Storage and Outlet Works) |
| 30 | | Final Design |
| 31 | | Permitting |
| 32 | | Bid/Award/Contracting |
| 33 | | Equipment/Material Manufacturing and Delivery |
| 34 | | Construction |
| 35 | | Bid Package B2 (Conveyance to WTP, Hydropower Facility) |
| 36 | | Final Design |
| 37 | | Permitting |
| 38 | | Bid/Award/Contracting |
| 39 | | Equipment/Material Manufacturing and Delivery |
| 40 | | Construction |
| 41 | | Bid Package B3 (Water Treatment Plant, Conveyance to Moscow and UI) |
| 42 | | Treatment Equipment Pre-Selection and Pilot Testing |
| 43 | | Final Design |
| 44 | | Permitting |
| 45 | | Bid/Award/Contracting |
| 46 | | Equipment/Material Manufacturing and Delivery |
| 47 | | Construction |



Project: Palouse GW Basin Alter
Date: Thu 7/1/21

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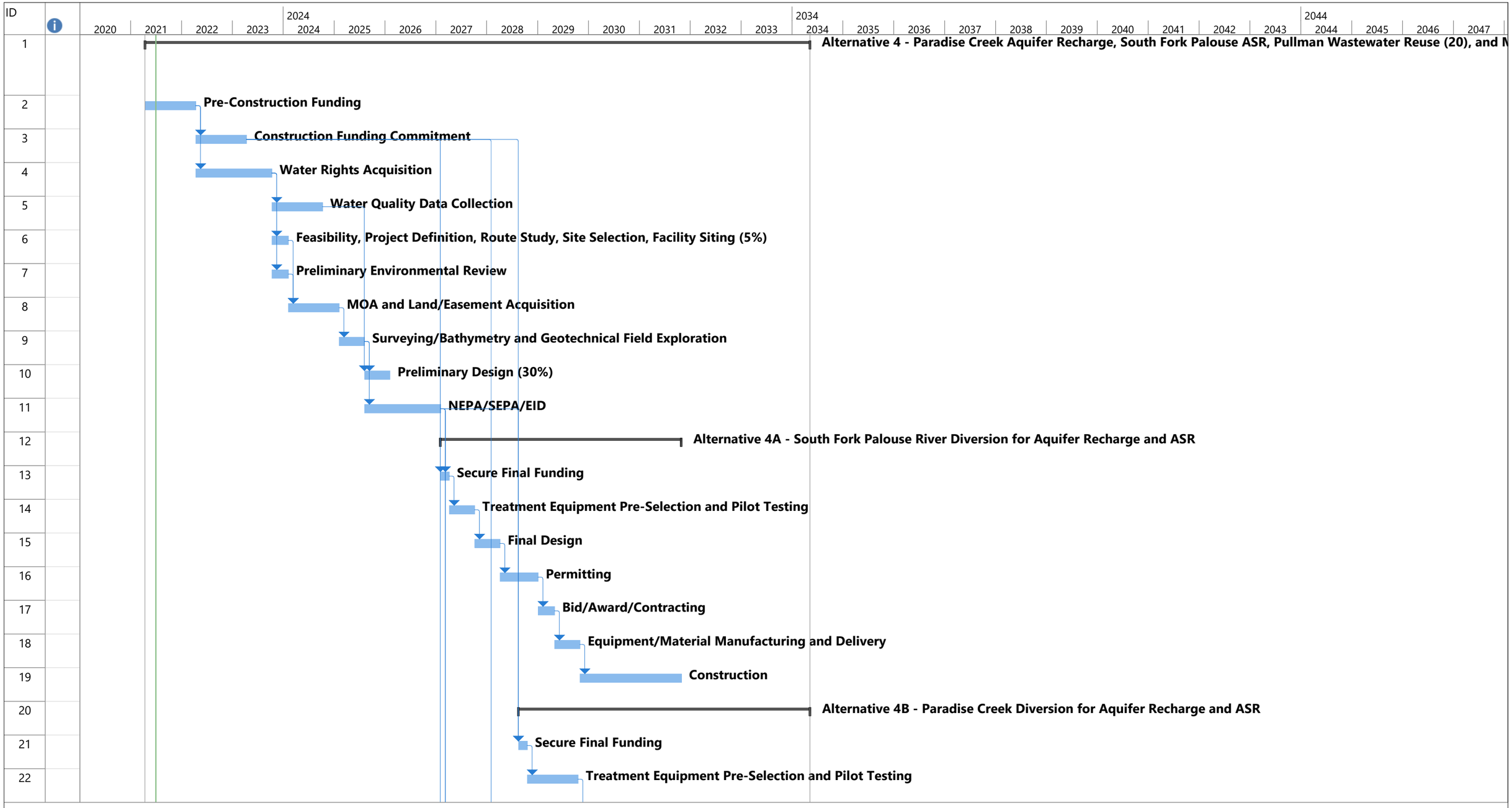
|---|---|---|---|---|---|---|---|
| Task | Project Summary | Manual Task | Start-only | Deadline |
| Split | Inactive Task | Duration-only | Finish-only | Progress |
| Milestone | Inactive Milestone | Manual Summary Rollup | External Tasks | Manual Progress |
| Summary | Inactive Summary | Manual Summary | External Milestone |




Project: Palouse GW Basin Alter
Date: Thu 7/1/21

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| Task | Project Summary | Manual Task | Start-only | Deadline |
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| Milestone | Inactive Milestone | Manual Summary Rollup | External Tasks | Manual Progress |
| Summary | Inactive Summary | Manual Summary | External Milestone |

| ID | | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 |
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| 23 | | | | | | | | | | | | Final Design | | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | Permitting | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | Bid/Award/Contracting | | | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | | | Equipment/Material Manufacturing and Delivery | | | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | | | | | Construction | | | | | | | | | | | | | |
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| 33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 37 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 41 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 43 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Alternative 4C - Wastewater Reuse in Pullman
Secure Final Funding
Final Design
Permitting
Bid/Award/Contracting
Equipment/Material Manufacturing and Delivery
Construction
Alternative 4D - Wastewater Reuse for Groundwater Recharge in Moscow
Secure Final Funding
Final Design
Permitting
Bid/Award/Contracting
Equipment/Material Manufacturing and Delivery
Construction
Alternative 4E - Additional Conservation
Secure Final Funding
Construction

Project: Palouse GW Basin Alter
Date: Thu 7/1/21

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Task | Project Summary | Manual Task | Start-only | Deadline |
| Split | Inactive Task | Duration-only | Finish-only | Progress |
| Milestone | Inactive Milestone | Manual Summary Rollup | External Tasks | Manual Progress |
| Summary | Inactive Summary | Manual Summary | External Milestone |

# Attachment 3
# Example Cash Flow Chart
# Cost Breakdown Tabulation

In order to apply costs to the project activity timelines and develop a cash flow, the costs for each alternative were broken down into the following categories: Environmental Permitting, Surveying/Bathymetry, Geotechnical Field Explorations, and Preliminary Design (30%). From there, each bid package is broken down into the following categories: Final Design, Permitting, Bidding Support, and Construction and Engineering Services During Construction (SDC). The breakdown of costs for each alternative are shown in Tables 1 to 4.

**Table 1. Alternative 1 Cost Breakdown for Cash Flow Development**

| | **Estimated Cost** |
|---|---|
| Environmental Permitting | $ 1,800,000 |
| Surveying/Bathymetry | $ 300,000 |
| Geotechnical Field Explorations | $ 600,000 |
| Preliminary Design (30%) | $ 2,800,000 |
| Bid Package 1 - Final Design | $ 6,200,000 |
| Bid Package 1 - Permitting | $ 600,000 |
| Bid Package 1 - Bidding Support | $ 600,000 |
| Bid Package 1 - Construction and SDC | $ 47,200,000 |
| Bid Package 2 - Final Design | $ 2,000,000 |
| Bid Package 2 - Permitting | $ 200,000 |
| Bid Package 2 - Bidding Support | $ 200,000 |
| Bid Package 2 - Construction and SDC | $ 15,600,000 |
| Bid Package 3 - Final Design | $ 1,900,000 |
| Bid Package 3 - Permitting | $ 200,000 |
| Bid Package 3 - Bidding Support | $ 200,000 |
| Bid Package 3 - Construction and SDC | $ 14,800,000 |
| Alternative 1 Contingency | $ 14,800,000 |

**Table 2. Alternative 2 Cost Breakdown for Cash Flow Development**

| | **Estimated Cost** |
|---|---|
| Environmental Permitting | $ 1,300,000 |
| Surveying/Bathymetry | $ 300,000 |
| Geotechnical Field Explorations | $ 500,000 |
| Preliminary Design (30%) | $ 1,900,000 |
| Bid Package A1 - Final Design | $ 200,000 |

**Table 2. Alternative 2 Cost Breakdown for Cash Flow Development**

| | Estimated Cost |
|---|---|
| Bid Package A1 - Permitting | $ 10,000 |
| Bid Package A1 - Bidding Support | $ 10,000 |
| Bid Package A1 - Construction and SDC | $ 1,200,000 |
| Bid Package A2 - Final Design | $ 1,600,000 |
| Bid Package A2 - Permitting | $ 100,000 |
| Bid Package A2 - Bidding Support | $ 100,000 |
| Bid Package A2 - Construction and SDC | $ 12,300,000 |
| Bid Package B1 - Final Design | $ 2,000,000 |
| Bid Package B1 - Permitting | $ 200,000 |
| Bid Package B1 - Bidding Support | $ 200,000 |
| Bid Package B1 - Construction and SDC | $ 15,300,000 |
| Bid Package B2 - Final Design | $ 2,000,000 |
| Bid Package B2 - Permitting | $ 200,000 |
| Bid Package B2 - Bidding Support | $ 200,000 |
| Bid Package B2 - Construction and SDC | $ 15,500,000 |
| Bid Package B3 - Final Design | $ 1,300,000 |
| Bid Package B3 - Permitting | $ 100,000 |
| Bid Package B3 - Bidding Support | $ 100,000 |
| Bid Package B3 - Construction and SDC | $ 9,900,000 |
| Alternative 2 Contingency | $ 10,300,000 |

**Table 3. Alternative 3 Cost Breakdown for Cash Flow Development**

| | Estimated Cost |
|---|---|
| Environmental Permitting | $ 1,800,000 |
| Surveying/Bathymetry | $ 400,000 |
| Geotechnical Field Explorations | $ 700,000 |
| Preliminary Design (30%) | $ 2,600,000 |
| Bid Package A1 - Final Design | $ 300,000 |
| Bid Package A1 - Permitting | $ - |

**Table 3. Alternative 3 Cost Breakdown for Cash Flow Development**

| | Estimated Cost |
|---|---|
| Bid Package A1 - Bidding Support | $ - |
| Bid Package A1 - Construction and SDC | $ 2,100,000 |
| Bid Package A2 - Final Design | $ 2,400,000 |
| Bid Package A2 - Permitting | $ 200,000 |
| Bid Package A2 - Bidding Support | $ 200,000 |
| Bid Package A2 - Construction and SDC | $ 18,200,000 |
| Bid Package B1 - Final Design | $ 2,100,000 |
| Bid Package B1 - Permitting | $ 200,000 |
| Bid Package B1 - Bidding Support | $ 200,000 |
| Bid Package B1 - Construction and SDC | $ 15,700,000 |
| Bid Package B2 - Final Design | $ 2,200,000 |
| Bid Package B2 - Permitting | $ 200,000 |
| Bid Package B2 - Bidding Support | $ 200,000 |
| Bid Package B2 - Construction and SDC | $ 16,600,000 |
| Bid Package B3 - Final Design | $ 2,800,000 |
| Bid Package B3 - Permitting | $ 300,000 |
| Bid Package B3 - Bidding Support | $ 300,000 |
| Bid Package B3 - Construction and SDC | $ 21,500,000 |
| Alternative 3 Contingency | $ 14,100,000 |

**Table 4. Alternative 4 Cost Breakdown for Cash Flow Development**

| | Estimated Cost |
|---|---|
| Environmental Permitting | $ 1,600,000 |
| Surveying/Bathymetry | $ 300,000 |
| Geotechnical Field Explorations | $ 600,000 |
| Preliminary Design (30%) | $ 2,400,000 |
| Bid Package 1 - Final Design | $ 300,000 |
| Bid Package 1 - Permitting | $ 30,000 |
| Bid Package 1 - Bidding Support | $ 30,000 |

**Table 4. Alternative 4 Cost Breakdown for Cash Flow Development**

| | Estimated Cost |
|---|---|
| Bid Package 1 - Construction and SDC | $ 2,400,000 |
| Bid Package 2 - Final Design | $ 1,800,000 |
| Bid Package 2 - Permitting | $ 200,000 |
| Bid Package 2 - Bidding Support | $ 200,000 |
| Bid Package 2 - Construction and SDC | $ 13,500,000 |
| Bid Package 3 - Final Design | $ 1,800,000 |
| Bid Package 3 - Permitting | $ 200,000 |
| Bid Package 3 - Bidding Support | $ 200,000 |
| Bid Package 3 - Construction and SDC | $ 13,500,000 |
| Bid Package 4 - Final Design | $ 4,900,000 |
| Bid Package 4 - Permitting | $ 400,000 |
| Bid Package 4 - Bidding Support | $ 400,000 |
| Bid Package 4 - Construction and SDC | $ 37,300,000 |
| Additional Conservation | $ 21,500,000 |
| Alternative 4 Contingency | $ 17,700,000 |

Jacobs

# Memorandum

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| | |
|---|---|
| **Subject** | **Water Supply Phased Alternatives – Annual Operations and Maintenance Cost Allocation** |
| **Project Name** | Palouse Groundwater Basin Alternative Water Supply |
| **Attention** | Palouse Basin Aquifer Committee (PBAC) |
| **From** | Perrin Robinson, Jacobs |
| **Date** | February 2022 |
| **Copies to** | Robin Nimmer, Alta |

## 1. Background

In July 2021, Jacobs prepared a *Water Supply Alternatives Interim Steps Technical Memorandum* (Jacobs 2021) for PBAC to identify opportunities for phasing each of the four water supply alternatives, and to describe the phasing approach with respect to required activities for project development and implementation, and estimated phased project funding requirements. This previous alternative phasing technical memorandum (TM) was prepared with the acknowledgement that each of the four primary alternatives require significant amounts of funding for project implementation. Phasing a project by pursuing interim steps in an organized approach allows required funding to be spread out over a longer period of time, and makes a project more achievable for the PBAC member entities by periodically securing smaller funding portions as part of the overall program and avoiding the need to secure the total funding all at once. Additionally, phasing a project and realizing that a portion of the water supply target will allow the basin entities to study and evaluate the project effects on the aquifer informs the timing to implement the follow-on phases.

The Jacobs (2021) TM addressed the following for each of the four alternatives:

- Alternative interim step descriptions (phases and bid packages)
- Project development and implementation activity descriptions
- Construction and soft cost allocations to each of the subalternative construction elements in May 2021 dollars
- Implementation activity duration assignments
- Phased alternative project implementation schedule development
- Example cash flow chart development

PBAC hired a consultant team in 2015 to evaluate previously studied water supply projects. Their work culminated in a report, entitled, *Palouse Groundwater Basin Water Supply Alternatives Analysis Report*

(PBAC 2017). The PBAC (2017) report included estimated capital and operations and maintenance (O&M) costs for each of the four alternatives. The PBAC report capital cost estimate values were used to inform the Jacobs (2021) TM.

Following submission of the Jacobs (2021) TM, PBAC requested that the O&M cost estimates be assigned to each of the phased alternatives as well.

# 2. Purpose

This TM has been developed to report the allocation of the O&M cost estimates for each of the phased alternatives.

# 3. Phased Alternative Descriptions

This section provides descriptions of the phasing for the four alternatives and supporting figures, as presented in the Jacobs (2021) TM. Refer to the Jacobs (2021) TM for phased alternative construction cost allocations, implementation scheduling, and example cash flow information.

The four alternatives were evaluated independently of each other to identify opportunities for establishing interim steps that could be achieved to frame phased projects. Alternatives 1 and 2 have interconnectivity that informed the phase development, whereas the other two alternatives comprise separate, discrete projects that are inherently divided to form the basis for interim step definition. Each of the alternatives has a number assigned (for example, Alternative 1), and lettering was assigned to each of the phases (for example, Phase 1A) to distinguish between the various associated implementation phases.

## 3.1 Alternative 1

For Alternative 1, two interim steps have been envisioned. The first phase (Phase 1A) consists of the Snake River diversion, the water treatment plant (WTP), and the associated conveyance system with water delivery to Pullman and WSU. For Phase 1A, pump stations and WTP would be constructed, and equipment would be installed to accommodate this first portion of design flow and to allow for capacity expansion when the subsequent phase has been advanced. The second phase (Phase 1B) consists of flow and treatment capacity expansions to the Phase 1A pump stations and WTP, and addition of the conveyance system (pump station and pipeline) for water delivery to Moscow and UI. Figure 3-1 shows the Alternative 1 phasing.

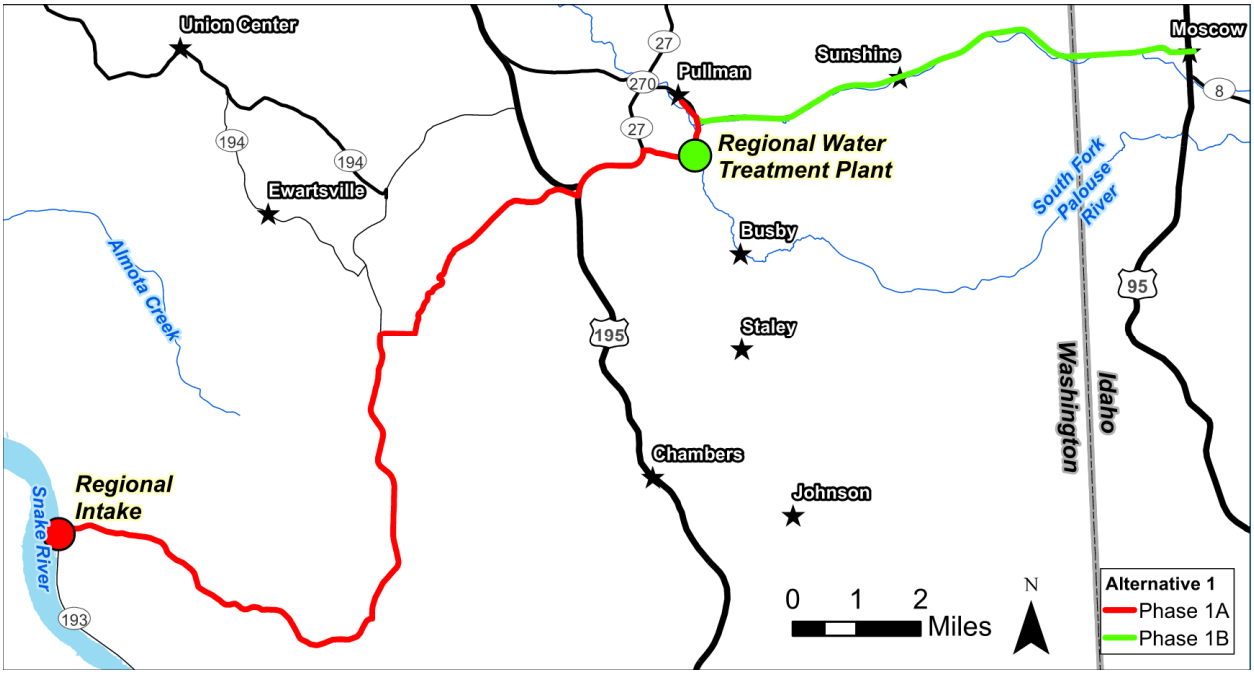


**Figure 3-1. Alternative 1 Phasing**

## 3.2 Alternative 2

Alternative 2 can first be separated into the Paradise Creek/South Fork Palouse River aquifer recharge (or direct use) for the Moscow project and the North Fork Palouse River diversion project. The Paradise Creek/South Fork Palouse River Moscow project (Phase 2A) is not shown to be broken down further into smaller phases given that it is a discrete project; however, there is an opportunity to phase the construction of the water treatment and recharge wells if a strategic reason for doing so is later identified.

The North Fork Palouse River diversion project (2B) can be implemented in two phases with Phase 2B1 consisting of:

- The river intake and pump station
- Conveyance to the WTP
- The WTP
- The conveyance system for water delivery to Pullman/WSU

Phase 2B2 entails:

- Increasing the pumping capacity at the intake pump station
- Increasing the treatment capacity at the WTP
- Increasing the pumping capacity for conveyance to Moscow
- The conveyance system for water delivery to Moscow/UI

Figure 3-2 depicts the Alternative 2 phasing.

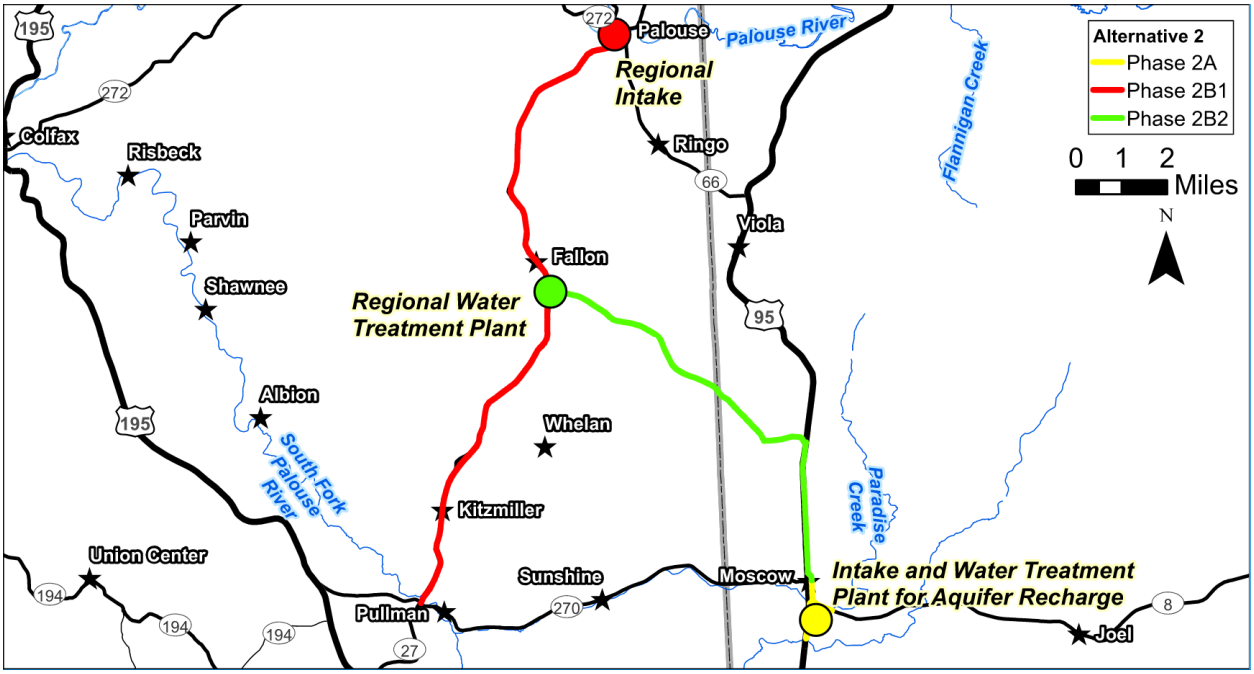


**Figure 3-2. Alternative 2 Phasing**

## 3.3 Alternative 3

Alternative 3 has two distinct, discrete project elements that suggest implementing it in two phases, with one phase being the South Fork Palouse River diversion for Pullman/WSU (Phase 3A) and the other phase aligning with the Flannigan Creek storage, conveyance, and treatment for Moscow/UI (Phase 3B). Figure 3-3 depicts the Alternative 3 phasing approach.

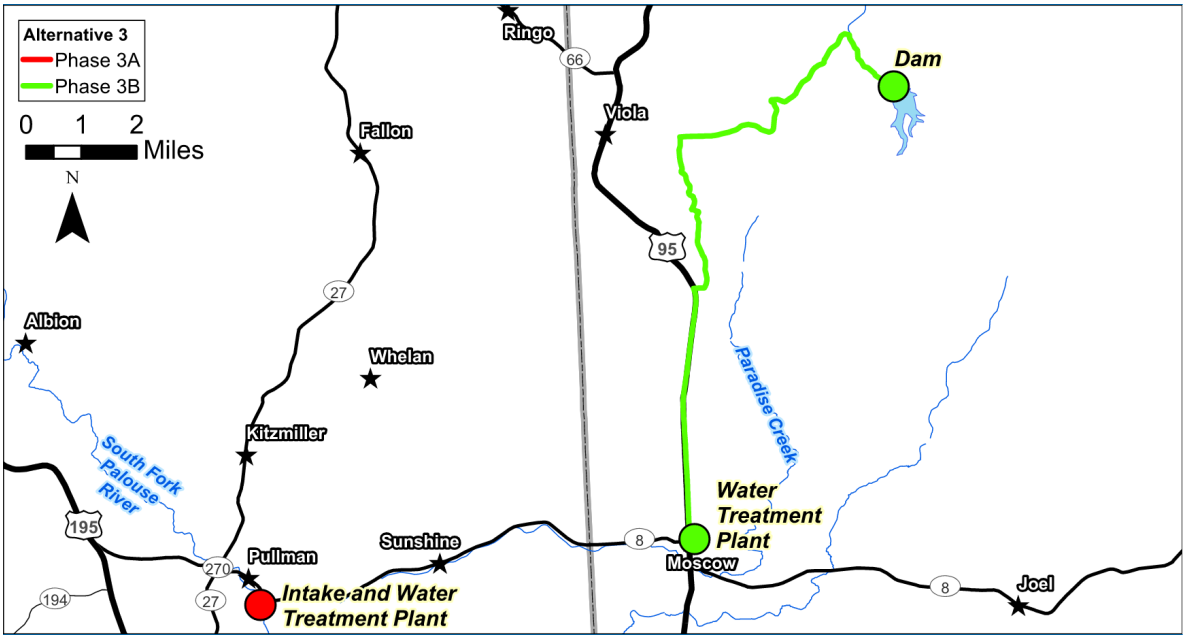


**Figure 3-3. Alternative 3 Phasing**

## 3.4 Alternative 4

Alternative 4 consists of five distinct, discrete project elements that are can be viewed as five separate phases. The following are the phase designation assignments and implementation sequencing that have been determined by others, as provided in the PBAC (2017) report.

- Phase 4A - South Fork Palouse River Aquifer Storage and Recovery (ASR) in Pullman
- Phase 4B - Paradise Creek aquifer recharge in Moscow
- Phase 4C – Wastewater reuse in Pullman
- Phase 4D – Wastewater reuse for groundwater recharge in Moscow
- Phase 4E – Additional water conservation measures

Figure 3-4 shows the phase locations for Alternative 4.

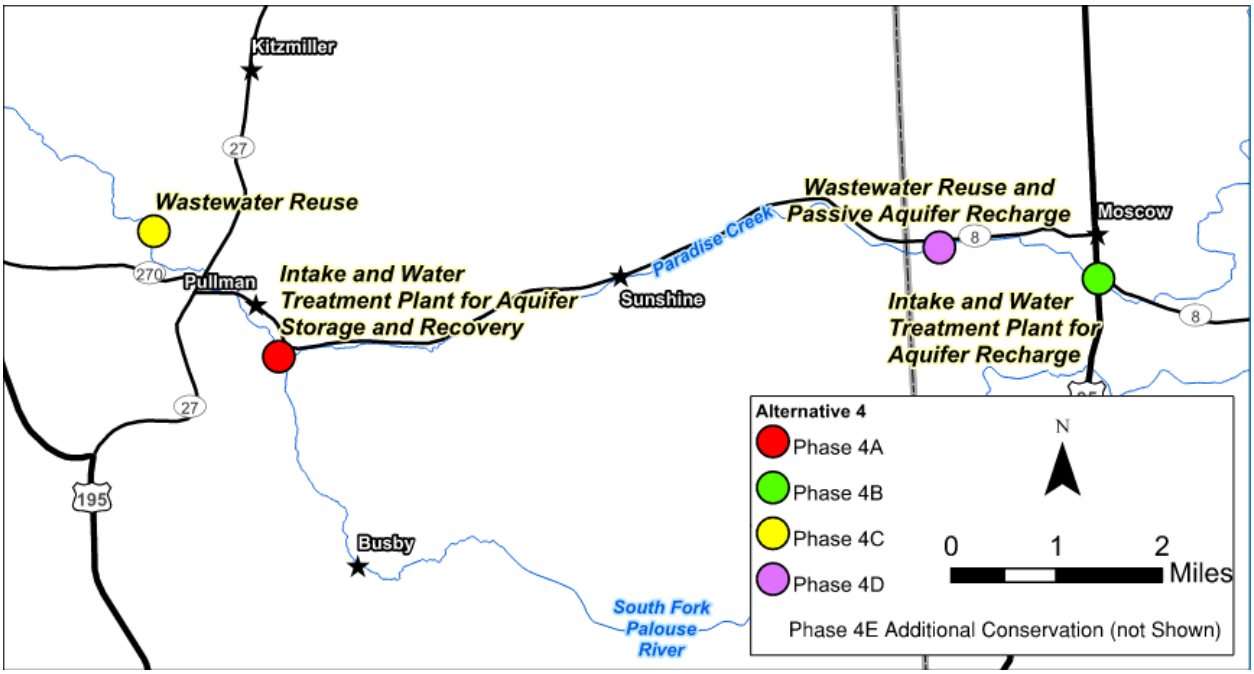


**Figure 3-4. Alternative 4 Phasing**

# 4. Phased Alternative Annual Operations and Maintenance Cost Allocation

Water supply project O&M cost estimate summaries for each of the four alternatives were provided in the PBAC (2017) report and were generated in terms of October 2016 dollars. The values from these O&M cost estimates served as the basis for cost allocations to each of the phased alternatives. These phased O&M cost allocations have been escalated to May 2021 dollars through application of the Engineering News-Record Construction Cost Index (ENR CCI) numbers, resulting in a 14.9% increase from October 2016 dollars to account for inflation and other market price adjustments. The O&M cost allocations were escalated to May 2021 dollars for consistency with the Jacobs (2021) TM. The reported ENR CCI numbers are 10434 for October 2016 and 11990 for May 2021.

For the alternatives that have WTP construction apportioned between two phases, the O&M costs were allocated in a manner consistent with the facility construction cost allocations, whereby 85% of the total O&M cost was applied to the Phase I operations and the remaining 15% was applied to the follow-on Phase II operations. A majority of the site and water treatment infrastructure would be in place following completion of Phase I construction, thereby requiring a substantial portion of the total O&M costs to run the facility. When the Phase II treatment capacity increases are implemented, additional staff will be required and additional utility expenses will be incurred.

For the alternatives that have pump station construction apportioned between two phases, the following allocations were developed for the initial, Phase I operations and the follow-on Phase II increased pumping capacity operations:

- Alternative 1:
  - A conceptual hydraulic and power cost model was developed to determine the approximate pumping cost for each pump station by phase. The resultant pumping costs from this modeling varied from the costs in the PBAC (2017) report, so the calculated percent split between phases was applied to the escalated PBAC (2017) report pumping cost values to maintain consistent cost reporting for comparative purposes between this TM and previous reports.
- Alternative 2:
  - A conceptual hydraulic model was developed for the pump station and pipeline from the WTP to the Moscow point of delivery to determine which pumps were assigned to Moscow in Pump Station No. 3 for pumping cost allocation. A power consumption and production model was then developed to allocate the pumping costs and hydropower generation revenues by facility for each phase. Similar to the Alternative 1 description, the calculated pumping costs and hydropower revenues varied from the PBAC (2017) report, so the calculated percent split between phases was applied to the escalated PBAC (2017) report pumping cost and hydropower generation values to maintain consistent reporting for comparative purposes between this TM and previous reports.

# 5. Results

Table 5-1 presents the escalated O&M costs for each alternative and allocation by phase.

**Table 5-1. Phased Alternative Escalated Operations and Maintenance Cost Estimate Allocations**

| Alternative No. | Description | Phase | Estimated Annual Water Supply | | Estimated Annual O&M Cost[a] | O&M Cost per Delivered Supply | |
|---|---|---|---|---|---|---|---|
| | | | MG | ac-ft | | $/MG | $/ac-ft |
| 1 | Snake River | | 1,967 | 6,040 | $6,044,000 | $3,073 | $1,001 |
| | | 1A | 984 | 3,020 | $3,980,000 | $4,045 | $1,318 |
| | | 1B | 983 | 3,020 | $2,064,000 | $2,100 | $683 |
| 2 | Paradise Creek/South Fork Palouse River, North Fork Palouse River | | 1,908 | 5,860 | $2,447,000 | $1,282 | $418 |
| | | 2A | 358 | 1,100 | $773,000 | $2,159 | $703 |
| | | 2B1 | 775 | 2,380 | $1,264,000 | $1,631 | $531 |
| | | 2B2 | 775 | 2,380 | $410,000 | $529 | $172 |

**Table 5-1. Phased Alternative Escalated Operations and Maintenance Cost Estimate Allocations**

| Alternative No. | Description | Phase | Estimated Annual Water Supply | | Estimated Annual O&M Cost[a] | O&M Cost per Delivered Supply | |
|---|---|---|---|---|---|---|---|
| | | | MG | ac-ft | | $/MG | $/ac-ft |
| 3 | South Fork Palouse River, Flannigan Creek | | 2,324 | 7,143 | $4,016,000 | $1,728 | $562 |
| | | 3A | 894 | 2,743 | $864,000 | $966 | $315 |
| | | 3B | 1,430 | 4,400 | $3,152,000 | $2,204 | $716 |
| 4 | Moscow and Pullman ASR and Water Reuse | | 1,284 | 3,954 | $1,838,000 | $1,431 | $465 |
| | | 4A | 358 | 1,100 | $773,000 | $2,159 | $703 |
| | | 4B | 358 | 1,100 | $773,000 | $2,159 | $703 |
| | | 4C | 148 | 454 | $205,000 | $1,385 | $452 |
| | | 4D | 420 | 1,300 | $87,000 | $207 | $67 |

[a] O&M cost estimate values escalated to May 2021 dollars.

Notes:

ac-ft = acre-feet
no. = number
MG = million gallon(s)

# 6. References

Palouse Basin Aquifer Committee (PBAC). 2017. *Palouse Groundwater Basin Water Supply Alternatives Analysis Report*. March.

Jacobs. 2021. *Water Supply Alternatives Interim Steps Technical Memorandum*. July.

# Appendix I

# Summary of PBAC February 2022 Decision Matrix Workshop

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# M E M O R A N D U M

**To:** PBAC

**From:** Robin Nimmer

**Alta Project No.:** 20008

**Subject:** **PBAC February 2022 Workshop Matrix Discussion Summary**

## 1 Introduction

Alta Science and Engineering, Inc. participated in a workshop on the Water Supply Alternatives Project with the Palouse Basin Aquifer Committee (PBAC) on February 17, 2022. Attachment A contains the workshop agenda. The goal of this workshop was to gain consensus on the water supply alternatives selection criteria for the matrix. Alta will use the criteria to populate a matrix to help quantify mostly qualitative information of the alternatives for ranking. We also proposed modifications to the existing Alternative 4.

## 2 Water Supply Alternatives

Dr. Nimmer presented the four water supply alternatives with interim steps and gave a summary of the work conducted. She also presented a new Modified Alternative 4 which would remove wastewater reuse and have direct use for Paradise Creek and South Fork of the Palouse River.

Discussions among the group included the following:

- Using more schematics instead of details on a map given locations for treatment plants, pipelines, and reservoir, given these have not yet been investigated or determined.
- Agreement in including Modified Alternative 4 in the investigation, which has direct use instead of aquifer storage and recovery (ASR) or aquifer recharge (AR) based on water quality concerns by the public. This alternative could still have the potential to include ASR/AR in the future.
- The benefit of ASR/AR is the ability to store the water when the water is available and remove it when the need is there. The communities will not be able to use all the supply available for direct use during the diversion months until a certain time when the water demand increases.

## 3 Criteria for Matrix

Alta plans to use the Preliminary Screening Matrix in Anchor QEA (2017) for consistency with the effort and consensus of PBAC during the alternatives' development. Dr. Nimmer presented these criteria, weights, and scoring. During the discussion, the group confirmed using the matrix as a tool to evaluate the alternatives and they modified weights for the following criteria:

- Unit Cost of Supply – from 10 (Anchor QEA's report) to 9 (new weight)

- Long-Term Supply Reliability – from 8 to a 10
- Technical Certainty of Success – from 8 to 6
- Extent of Regional Agreements Required – from 3 to 4
- Public Acceptability – from 6 to 8

Dr. Nimmer also presented potentially adding additional criteria for discussion, including surface water quality and groundwater quality. Surface water quality is based on whether the diversion location would be downstream of a wastewater treatment plant or industrial discharge. Groundwater quality is based on whether treated water is injected or passively recharging the aquifer. These criteria are given a weight of 6. PBAC agreed with including them in the matrix.

Attachment A

PALOUSE BASIN AQUIFER committee

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pbac@uidaho.edu | www.uidaho.edu/pbac

**PBAC WATER SUPPLY ALTERNATIVES MATRIX DECISION WORKSHOP – FEBRUARY 17TH, 2022, 3:00 PM – 5:30 PM**

MOSCOW, APPALOOSA ROOM, BEST WESTERN UNIVERSITY INN, 1516 PULLMAN ROAD
(HTTPS://UIDAHO.ZOOM.US/J/5202533157) PASSCODE: PBAC

## Agenda

1) Introductions

2) Workshop Outcomes

3) Project Status Update

4) Potential Modified Alternative 4 for Inclusion

5) Matrix Criteria: Existing

6) Matrix Criteria: New Inclusions

7) Recap of Workshop Outcomes

8) Adjourn

# Appendix J
# Criteria for Comparing Projects

## Criteria for Comparing Projects

Anchor QEA et al. (2017) used eight criteria for comparing projects, intended to address the primary benefits and challenges associated with the projects considered. Each criterion has a scoring system that they used to calculate a project priority score. They then assigned weights to each criterion, allowing some criteria to more strongly influence the selection and prioritization of projects.

Based on the discussions during the February 2022 PBAC workshop, two additional criteria are added and some of the weights were adjusted. These are shown below.

| | Screening Criteria | 2017 Weights | Current Weights |
|---|---|---|---|
| A | Unit Cost of Supply (Capital Cost and O&M) | 10 | 9 |
| B | Long-Term Supply Reliability | 8 | 10 |
| C | Technical Certainty of Success | 8 | 6 |
| D | Property Acquisition | 6 | 6 |
| E | Permitting Complexity – Water Rights | 6 | 6 |
| F | Permitting Complexity – Environmental | 6 | 6 |
| G | Extent of Regional Agreements Required | 3 | 4 |
| H | Public Acceptability | 6 | 8 |
| I | Water Quality – Receiving Water | NA | 6 |
| J | Water Quality – Giving Water | NA | 6 |

NA = not applicable
O&M = operating and maintenance

Each alternative phase is scored in the matrix, with the exception of the individual phases with conveyance to both Pullman and Moscow (Alternatives 1 and 2B). These are not scored individually because 1) the cost of the first phase is significantly higher than the second phase (impacting Criterion A), and 2) the scores for the remaining criteria are the same for both. For example, Alternative Phase 2B is scored, but not the individual Alternative Phases 2B1 and 2B2.

The following sections are taken from Anchor QEA et al. (2017) with the addition of Screening Criteria I and J and slight modifications to update for this 2022 report.

## Criteria Definitions and Scoring

This section provides a system for scoring each project based on the ten criteria listed above. It should be noted that any given project may be proposed in order to meet a specific need represented by a single criterion. However, many projects offer ancillary benefits (and conversely, may have multiple challenges) as well. Therefore each project should be reviewed for the full range of criteria listed. The criteria are meant to provide a consistent basis for ranking projects and to document the rationale for advancing those projects for further evaluation.

## A. Unit Cost of Supply

This criterion reflects the cost per unit volume of water supplied. It would give priority to projects that have a low cost per volume of water supplied.

| Project Ranking Scores | |
|---|---|
| **Unit Cost of Supply**<br>**Weight = 9** | **Ranking Score** |
| Project has the highest unit cost of all projects<br>Comparing Alternatives 1, 2, 3, and 4: $138,708/AF (Alternative Phase 4C).<br>Comparing Alternatives 1, 2, 3, and Modified 4: $66,763/AF (Alternative 1) | 0 |
| Projects are scored relative to one another on the 0-3 scale, based on normalization against the highest unit cost project | Normalized against highest cost |
| Project has low unit cost (i.e., approaching $0/AF) | 3 |

## B. Long Term Supply Reliability

Refers to a project's expected ability to provide all or a portion of the estimated 50-year water demand across an anticipated range of climatic conditions (e.g., wet, normal, dry) and meeting acceptable service standards during catastrophic events such as a severe drought (adapted from California Urban Water Association or CUWA August 2012 report – see http://www.cuwa.org/pubs/CUWA_WaterSupplyReliability.pdf). The scoring gives priority to projects that are expected to maintain the projected quantity by having more resistance to climatic shifts and other sources of variability.

| Project Ranking Scores | |
|---|---|
| **Long Term Supply Reliability**<br>**Weight = 10** | **Ranking Score** |
| Project may have great variability in yield year-to-year and does not have significant resiliency relative to climate change | 0 |
| Project is expected to have moderate variability in yield year-to-year and moderate<br>resiliency relative to climate change | 1.5 |
| Project is expected to offer 50 years of relatively consistent supply, and has climate change resiliency | 3 |

### C. Technical Certainty of Success

Technical certainty considers whether or not the technical data and operating experience regarding a given project or its proposed type of technology supports a high level of likely success. For example, a high score would be assigned to a project that utilizes known and proven technology, while a low score might be assigned to an aquifer recharge project where there are little data on whether the desired geologic and aquifer conditions exist to support successful water withdrawal, or a water reclamation technology that has been in use for a relatively short period of time, i.e., less than is necessary to verify the technical efficacy of the technology.

| Project Ranking Scores | |
|---|---|
| **Technical Certainty of Success**<br>**Weight = 6** | **Ranking Score** |
| Project technical basis data does not exist or there is no technology operating record available | 0 |
| Project technical basis data is limited or technology operating record are not well established | 1 |
| Project technical basis data well established and accepted, but the operating record is less than necessary to verify the technology efficacy | 2 |
| Project technical basis data and technology operating record are established and accepted with a long history of success | 3 |

### D. Property Acquisition

This criterion considers the anticipated ease or difficulty expected in acquiring the property and right of way necessary to implement the project. Projects with long portions of pipelines requiring right of way in, or that require land purchase in sensitive lands, land owned by the federal government, or land owners that have been known to be difficult to work with in the past will score lower.

| Project Ranking Scores | |
|---|---|
| **Property Acquisition**<br>**Weight = 6** | **Ranking Score** |
| Project crosses multiple properties with diverse ownership, including likely problematic property/easement acquisitions; or, there is at least one property for which acquisition is expected to be extremely problematic | 0 |
| Project partially within existing right of ways and will require a medium level of property acquisition | 1.5 |
| Project primarily within existing right of ways and requires minimal to no property acquisition | 3 |

## E. Permitting Complexity – Water Rights

Acquiring new water rights today can be difficult and complex. This criterion addresses whether the water right path will be both difficult and complex. Projects are scored higher if the water rights path is not expected to be contentious with other appropriators and in-stream rights.

| Project Ranking Scores | |
|---|---|
| **Permitting Complexity – Water Rights** | **Ranking Score** |
| **Weight = 6** | |
| Project is expected to encounter resistance from other appropriators and in-stream rights | 0 |
| Project is expected to encounter resistance for in-stream rights | 1 |
| Project is expected to encounter resistance from other appropriators | 2 |
| Project is not expected to encounter resistance from other appropriators and in-stream rights | 3 |

## F. Permitting Complexity – Environmental

Environmental permitting can be critical to project success. For this criterion projects are scored higher if the project is not expected to trigger federal permitting requirements, e.g., NEPA or CWA, state ASR permitting, and does not cross environmentally sensitive land.

| Project Ranking Scores | |
|---|---|
| **Permitting Complexity – Environmental** | **Ranking Score** |
| **Weight = 6** | |
| Project is expected to have significant environmental permitting complexity (e.g., triggers federal permitting, requires ASR or anti-degradation related permitting, and/or crosses sensitive land) | 0 |
| Project is expected to have moderately complex environmental permitting | 2 |
| Project is not expected to trigger federal permitting or ASR permitting, but is expected to cross sensitive land | 2 |
| Project is expected to have minimal environmental permitting requirements (i.e., does not trigger federal permitting, require ASR or anti-degradation related permitting, or cross sensitive land) | 3 |

## G. Extent of Regional Agreements Required

This criterion addresses the anticipated jurisdictional complexity of the proposed projects. The scoring gives priority to projects that require fewer agreeing parties and fewer funding parties.

| Project Ranking Scores | |
|---|---|
| **Extent of Regional Agreements Required**<br>**Weight = 4** | **Ranking Score** |
| Project requires regional agreements and regional funding approaches | 1 |
| Project does not require regional agreements and regional funding approaches | 3 |

## H. Public Acceptability

Refers to a project's expected ability to garner support from parties that will benefit from the project and not receive criticism from parties who will not benefit from the project, but who might be impacted by the project. Higher score projects are those that are expected to have greater support and fewer critics.

| Project Ranking Scores | |
|---|---|
| **Public Acceptability**<br>**Weight = 8** | **Ranking Score** |
| Project is expected to receive little support from beneficiaries and be challenged at multiple steps by critical affected parties | 0 |
| Project is expected to receive strong support from beneficiaries and be challenged at multiple steps by critical affected parties | 1 |
| Project is expected to receive little support from beneficiaries and to have few critical affected parties | 2 |
| Project is expected to receive strong support from beneficiaries and to have few critical affected parties | 3 |

## I. Surface Water Quality Impacts

This criterion addresses water quality upstream of the project, potentially impacting water quality of the project. Higher score projects are those that are not downstream of community or industrial discharge.

| Project Ranking Scores | |
|---|---|
| **Water Quality – Receiving Water**<br>**Weight = 6** | **Ranking Score** |
| Project is located downstream of a wastewater treatment plant or industrial plant. | 1 |
| Project is not located downstream of a wastewater treatment plant or industrial plant. | 3 |

## J. Aquifer Water Quality Impacts

This criterion addresses the impact to groundwater due to the project. Higher score projects are those that do not inject water into the aquifer and therefore, there is no potential for aquifer contamination.

| Project Ranking Scores | |
|---|---|
| **Water Quality – Giving Water**<br>**Weight = 6** | **Ranking Score** |
| Project has treated surface water injected into the aquifer (ex. aquifer storage and recovery, aquifer recharge) | 1 |
| Project does not have treated surface water injected into the aquifer | 3 |

# Appendix K
# Financing Investigation

Jacobs

# Memorandum

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| | |
|---|---|
| **Subject** | **Financial Strategy Technical Memorandum** |
| **Project Name** | Palouse Groundwater Basin Alternative Water Supply |
| **Attention** | Palouse Basin Aquifer Committee (PBAC) |
| **From** | Michael Matichich, Julia Long, Perrin Robinson |
| **Date** | August 2021 |
| **Copies to** | Robin Nimmer/Alta |

## 1. Introduction

This technical memorandum has been developed to summarize what is currently known about funding and financing options to implement the Palouse Groundwater Basin Alternative Water Supply project (Palouse Basin project), and to provide recommendations on steps to further refine a preliminary financing strategy identified in this document. Key elements of the memorandum include:

- An overview of a financial planning process that many agencies facing significant capital investments have found useful
- A discussion of why focus is needed on Steps 1 and 2 of the financial planning process to make significant progress in advancing financial planning for this project
- Preliminary findings on funding and financing mechanisms that are likely relevant as part of a financing strategy for this project
- Identification of three key decisions that need to be made to further advance the development of a financing strategy for the project

## 2. Overview of Recommended 4-Step Financial Planning Process

Figure 2-1 outlines a four-step process that many agencies have found useful in planning for the financing and funding of large capital programs when a significant increase in capital spending is required. Each of the four steps is described briefly below.

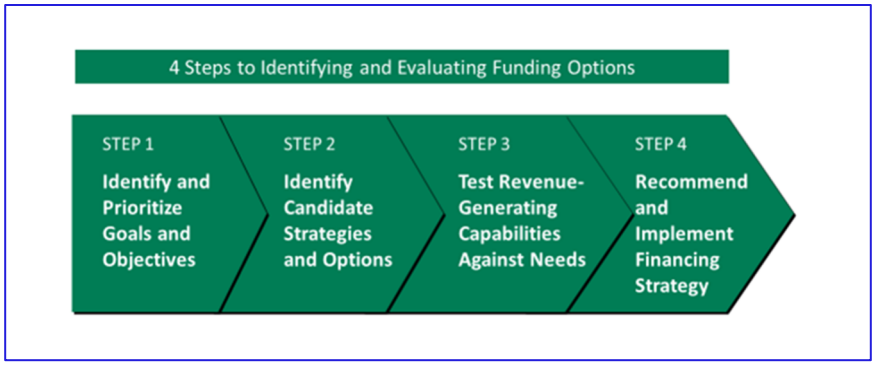


**Figure 2-1. Financial Planning Process**

## 2.1 Step 1: Establish Funding Goals

A key first step in the development of a funding strategy is to identify and prioritize the goals and objectives for the funding program. Examples of objectives that might be included are:

- Maximizing the revenue-generating sufficiency of the funding method
- Minimizing the implementation difficulty
- Earning stakeholder approval
- Securing funding reliability over time
- Providing equity to customers and other affected stakeholders
- Determining potential impacts on the financial strength and bond rating of the financing entity

Figure 2-2 illustrates how the primary goals for the funding program can be organized and structured to include important sub-goals as well. For example, supporting financial strength may include implementing funding programs that both protect the financial strength and ratings of government entities and supporting the local economy and following financing paths that minimize interest rates and other costs of capital.

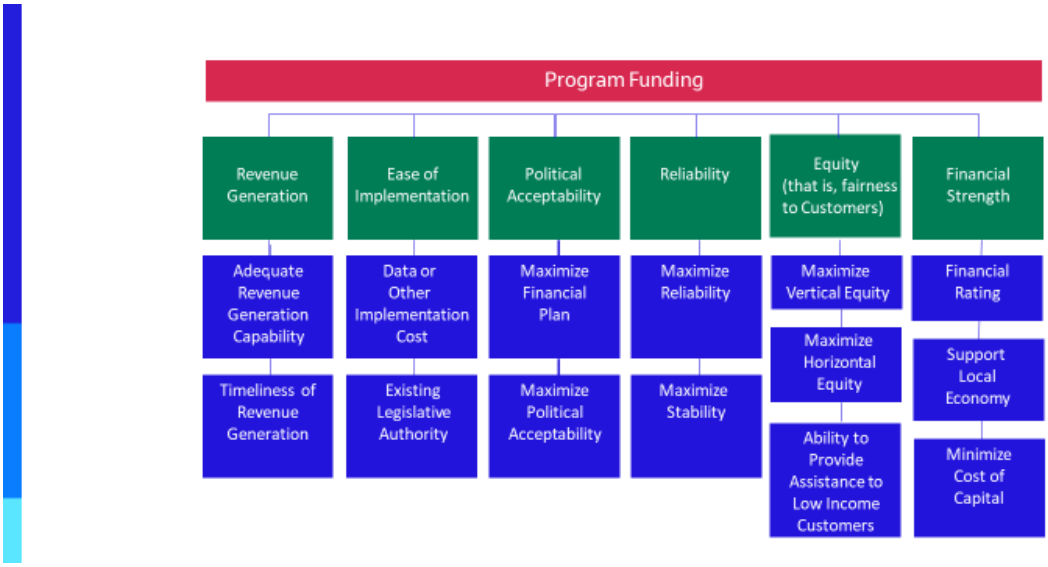


**Figure 2-2. Step 1: Identify and Prioritize Objectives to Meet Stakeholder Needs**

## 2.2 Step 2: Identify Potential Funding and Financing Mechanisms

The objective of this step is to identify funding sources and strategies for the various elements of the capital program, and how they could be combined into funding strategies that provide full funding for the identified program costs. Figure 2-3 provides a high-level example of how a strategy table might map relevant funding sources for the components of a capital program.

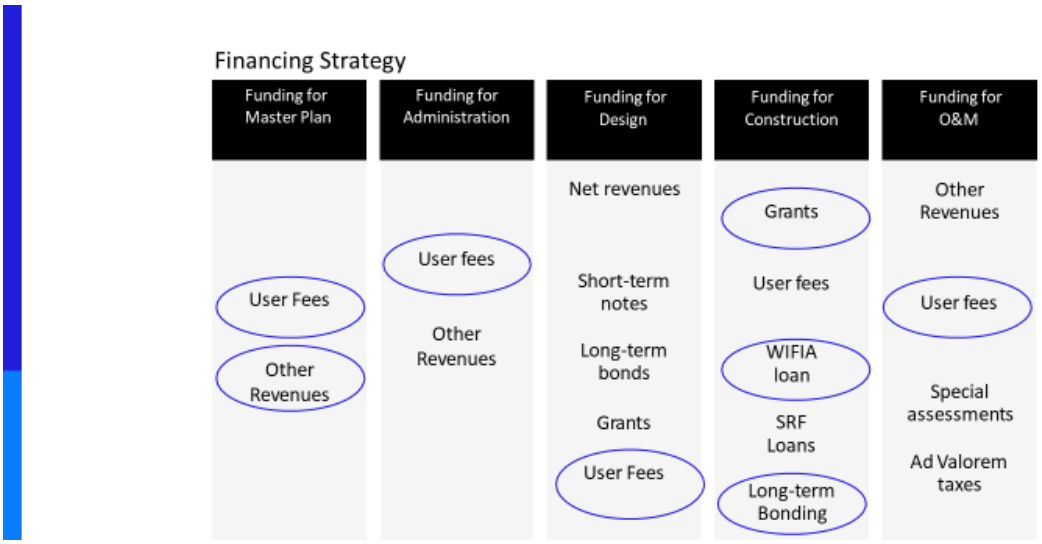


**Figure 2-3. Strategy Table that Shows how Funding Sources Can Be Combined**

Section 4 includes a strategy table that was developed for this project based on research conducted to date, which includes:

- Seeking state grants, other federal resources, foundation grants, and other philanthropic resources to supplement the funding raised to date by PBAC and funding that will be provided through borrowing or taxes and fees for the large capital program
- Evaluating opportunities to deploy traditional municipal funding/financing sources, such as taxes, fees, and municipal borrowing
- Exploring opportunities to deploy private capital through the expanding forms of collaborative delivery and finance, ranging from more typical forms of design-build-operate-finance solutions to emerging forms of pay-for-performance models, in which the private compensation is tied to technology and delivery performance metrics

As an example of our work to identify and evaluate creative funding options tailored to specific planned uses, Jacobs partnered with the Natural Resources Defense Council and the Center for Community Progress to identify and evaluate the appropriateness of more than 45 funding and financing mechanisms, ranging from traditional municipal finance to emerging forms of public-private partnerships , to provide funding for eight priority uses of open space that were identified as part of Detroit Open City's planning for a sustainable future for the City of Detroit, Michigan. The matrix is posted on the Detroit Future City website (Detroit Future City 2015). Figure 2-4 illustrates a portion of the resulting evaluation of funding options.

APPENDIX 6. SUMMARY TABLE: FUNDING TOOLS AND OPEN SPACE USE TYPE APPLICABILITY

| FUNDING TOOL | | GENERAL CHARACTERISTICS | | | APPLICABILITY FOR SPECIFIC OPEN SPACE USES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Productive Land Uses | | | | Various | Natural Land Uses | | Parks/Rec | |
| Type | Source | Likely Applicability to Open Space Funding | Explanation of tool | Notes on applicability | Urban Farm | Solar | Biofuel | Tree Farm | Green Stormwater Infrastructure | Meadow | Forest | Greenway | Other Comments |
| DIRECT FEES | User fees and charges | High | User fees include the fees charged for the use of public infrastructure or goods (e.g., a toll road or bridge, water or wastewater systems, or public transit). Fees are typically set to cover a system's operating and capital expenses each year. | Public infrastructure or goods that can collect a user fee (e.g., a toll road or bridge, water or wastewater systems, or public transit). Fees can then be used to cover debt service for improvements to the system. | High | High | Medium | Medium | High | Low | Low | Low | |
| | Property taxes/general fund revenues | High | For uses that don't have revenue-generating potential, the City could devote some of its scarce General Fund revenues, generated from property taxes or General Fund operating reserves/surpluses, to help get activities started.<br><br>With voter approval, special taxes could also be considered which could enable a dedicated source of funding. Examples include an open space millage structured around a Metropolitan District, or a Community Preservation Fund. | For current general fund revenue, uses that do not have revenue-generating capability.<br><br>Special millages would have greater flexibility based on how they are structured. | Low | Low | Low | Low | Low | Medium | Medium | Medium | Likely limited funding available in the near-term, prospects could be greater in the longer term. |
| | Public benefit funds | Low | Public benefit funds are the collection of funds generated by a small surcharge on a customer's electricity bills, without regard to who the electric provider is. | Have mostly been used to support energy efficiency and energy renewal projects. | N/A | Medium | N/A | N/A | N/A | N/A | N/A | N/A | Typically used to support energy efficiency funds. Source is typically small surcharge on electric bills. |
| | Ground lease financing | Medium | DLBA would lease land for open space use and securitize future lease payments using any proceeds to acquire or develop future land. | | Medium | High | High | Medium | High | Low | | | |
| | Transfer fee fund | Low | Private fees levied in certain real estate transactions where a transfer of property ownership occurs, typically as a percentage of the transaction price.<br><br>Community Preservation Funds (CPF) are tax programs implemented by states and municipalities to fund their open space protection and enhancement. New York's was established largely with a transfer fee. CPF is then used to purchase land or development rights from willing sellers in order to protect community character. | Likely will have greater support if it is framed around a use with a clear public benefit and one that may increase property value. | Low | N/A | N/A | N/A | N/A | Low | | | |


Source: Detroit Future City 2015.
**Figure 2-4. Case Example of a Funding Source Evaluation Matrix**

The process and products of this effort are described in more detail in an article in the Smart Cities Council Newsletter (Matichich and Mittag 2016).

## 2.3 Step 3: Identify Revenue-generating Capabilities of Identified Funding Strategies

The next step in the funding evaluation process will be to identify the ability of the targeted funding strategies to generate the revenues required to implement the watershed program. A spreadsheet model or other form of financial projection should be developed to project revenue requirements and projected revenues over time for several funding strategies. Implications for program implementation should also be evaluated. For example, some funding methods, such as creating a new tax or fee program, may require some implementation time in order to develop the databases or other information required to implement the method.

## 2.4 Step 4: Develop Funding Strategy

The purpose of this step is to develop a specific implementation plan with identified responsibilities for the key activities that have been identified as necessary to implement the recommended funding strategy.

# 3. Focus on Steps 1 and 2

The remainder of this memorandum focuses primarily on Step 1 and Step 2 of the financial planning process. The primary reasons for this, as detailed below, are:

- The estimated $60 million to $90 million implementation cost of the primary engineering solutions under consideration will require borrowing funds in order to make the program affordable to property owners and local governments involved.
- PBAC is not currently structured in a way that enables it to issue bonds or borrow funds from state and federal loan programs. Addressing the governance issues to identify which entity or entities will borrow funds is an essential step that needs to precede the development of a detailed financial plan.
- The selection of an engineering solution should precede finalizing the governance resolution for financing, because some project options involve different communities, counties, and even states.

## 3.1 Size of the Capital Program Requires Borrowing to be Affordable

The size of the capital program is estimated to be between $60 million and $90 million, depending on which of the primary engineering options is selected, when expressed in 2021 dollars; construction cost inflation will increase the actual capital spending required above those current estimated levels. Portions of the project may be eligible for grant funding that could reduce the required amount that would need to be repaid by local governments or property holders/customers within the project service area. But, as a practical matter, grant funding is limited and cannot be relied upon to fund most of the project expenditures. Given that, the significant capital costs required to realize the significant benefits provided by this program will largely need to be borne by the local service area property owners or local government agencies. A $60 million capital cost would be too large to impose on local agencies in a single fiscal year, so to make the program affordable, it will be necessary for some agencies to borrow money by issuing bonds or securing loans that would be repaid over a period of time, such as 20 or 30 years, to enable local agencies and customers to afford the implementation costs of the program.

## 3.2 Addressing Governance/Organizational Funding Strategy Issues Needs to Precede Development of a Detailed Financing Plan

PBAC, as it is currently organized, does not have the ability to issue municipal bonds or secure loans through state revolving fund programs or other forms of borrowing. A primary reason for this is that PBAC does not have the power to impose taxes or user fees on retail-level customers such as property owners or water system customers, and therefore cannot secure a finance grade credit rating that would be needed to borrow funds directly.

As detailed in the remainder of this section, selecting which engineering option to implement and identifying which entity or entities will issue the debt needed to implement the project need to precede the development of a specific financing plan. Those early decisions influence the determination of which entities should address the financing questions. Examples of some of those linkages include:

- Some options expand the service area to include portions of both Idaho and Washington. If one of those options are selected, the pooled financing powers of existing local agencies or a potential new authority that might be created under Idaho and Washington laws become possibilities. In addition, the possibility of supporting grants or loans through both state agencies may become part of the potential pool of viable funding and financing sources.
- Options that are more limited in scope, where the primary benefits are realized mainly within a single county or city might lend themselves more readily to being financed with bonds or loans issued by one of the existing government entities whose residents/property owners might be the primary beneficiaries of the project capital expenditures, and whose residents/property owners could therefore be expected to assume the ongoing operational cost responsibilities for maintaining assets built as part of the project.

### 3.2.1 Selecting the Financing Entity or Entities

A prerequisite to developing a detailed financing plan is to identify a specific entity or entities empowered and willing to take on an issuance of debt sufficient to implement the selected engineering solution:

- **Empowerment** includes having the legal capability to issue bonds and/or apply for and secure loans for the capital program and the powers needed to impose taxes or fees to repay the debt or to secure potions of the repayment through contractual arrangements with other entities empowered to make such commitments.
- **Willingness** includes having the political will to prioritize a commitment to implementing the project over competing priorities for other projects that a city, county, or other empowered entity might have need to consider. It also includes being willing to commit to the level of repayments that are required to achieve the identified project benefits, based on input from customers, property owners, governing board members, and other stakeholders to the decision process. Securing willingness to finance the program may require stakeholder outreach and engagement if there is insufficient public understanding of the benefits provided by the project or a lack of acceptance of the fees, taxes, or other charges that will need to be imposed to repay the borrowed funds and support the operating costs of the project.

### 3.2.2 Potential Financing Entities

As detailed in this section, there are multiple existing government agencies or potential future entities that might be created that could issue debt or apply for grants or loans for the large construction program that is selected for implementation in the Palouse Basin. The subsections below discuss factors that could impact the empowerment and willingness of these entities to take on the financing responsibility for the program.

#### 3.2.2.1 City Government(s)

Municipal governments such as the City of Moscow and the City of Pullman are empowered to issue municipal bonds that provide public service to their residents and can take on debt that serves a broader regional purpose with consent from governing bodies and support from citizens. They are also empowered to allocate their general fund resources raised through property taxes to address public purposes that benefit the general welfare of their populations. There is precedent for such regional debt being undertaken by a city government in the study area related to airport improvements. The City of Pullman issued debt for improvements required at the Pullman-Moscow Regional Airport, because the Pullman-Moscow Regional Airport Board, which was formed under a joint operations agreement entered into by the cities of Pullman, Washington and Moscow, Idaho, is not empowered to issue municipal debt of its own.

A variation on this option would be for multiple city governments to issue portions of the debt required to support the project.

Factors that would affect the willingness of the city governments to undertake the debt for the Palouse Basin project include:

- Level of existing outstanding debt and credit rating
- Other projects on the capital improvement program (CIP) lists of the cities that might compete for use of the debt capacity of the city
- Size of the Palouse Basin project (cost) and extent to which the construction and benefit occur within the limits of the city

- Level of city council, city leadership, and general population support for the Palouse Basin project, and priority among these groups to realize the benefits from the project compared with competing municipal goals (education, transportation, parks, and other public service needs)

#### 3.2.2.2 County Government(s)

County governments such as Whitman County and Latah County are empowered to issue municipal bonds that provide public service to their residents and can take on debt that serves a broader regional purpose with consent from governing boards and support from citizens. They are also empowered to allocate general fund resources raised through property taxes to address public purposes that benefit the general welfare of the population within their geographic boundaries.

A variation on this option would be for multiple county governments to issue portions of the debt required to support the project.

Factors that would affect the willingness of county governments to undertake the debt for the Palouse Basin project include:

- Level of existing outstanding debt and credit rating
- Other projects on county CIP lists that might compete for use of the debt capacity of the agencies
- Size of the Palouse Basin project (cost) and extent to which the construction and benefit occur within the limits of the county
- Level of county board, county staff leadership, and general population support for the Palouse Basin project, and priority among these groups to realize the benefits from this project compared with competing county goals such as education, transportation, parks, and other public service needs.

#### 3.2.2.3 Other Potential Local Entities: Universities

The two local universities located within the basin, Washington State University and University of Idaho, have been active participants in addressing the declining aquifer. Both of these universities could potentially fund the capital cost for a project through the use of an endowment fund or general fund and replace the expended funds through a giving campaign, adjustment of tuition rates, or other method.

Many of factors that affect the willingness of other entities described herein to undertake the debt for the Palouse Basin project apply:

- Level of existing outstanding debt and credit rating
- Other projects these entities plan to develop
- Size of the Palouse Basin project (cost) relative to available funds, debt capacity, and extent to which the construction and benefit occur within the limits of these entities
- Level of support for the Palouse Basin project among the executive teams, boards, alumni, and other influential stakeholders, and the relative priority of this project among those groups

#### 3.2.2.4 A New Authority Created Under Idaho and/or Washington Legislation

Most states have statutes that allow for the creation of special purpose districts, and in certain cases those districts have taxing and financing powers. A special report, *Special Districts In Idaho*, identifies several sections of Idaho State Code that might allow the creation of a special district that could issue taxes and bonds to implement the Palouse Basin project, as summarized in Table 3-1 (State of Idaho Legislative Services Office 2014).

**Table 3-1. Authorizing Legislation for Special Districts Related to Water in Idaho**

| Idaho Code Section | District Type | Oversight | Taxing Authority |
|---|---|---|---|
| 50-3103 | Community Infrastructure | City or County Governing Body | Y |
| 42-3202 | Water and/or Sewer | District Court | Y |
| 42-3705 | Watershed | Idaho Soil Conservation Commission | Y |
| 42-5202 | Groundwater | County | Y |

Source: *Special Districts In Idaho*, State of Idaho Legislative Services Office, 2014.

Special purpose districts can also be created in Washington State. According to MRSC (2021):

> *The state legislature provides authority and specifies general procedures for the formation and dissolution of special districts…*
>
> - *The majority of special purpose district governments in Washington State are formed by a resolution of the county legislative authority or by a petition to the county legislative authority.*
> - *Almost all formations require a formal hearing to determine the need for the district, and, in some instances, a feasibility study is required, such as for diking districts, irrigation districts, and park and recreation service areas.*
> - *The formation of a district generally requires an election to determine whether the majority of residents or landowners wish to form a district and pay taxes to receive the service. A few districts are formed after a hearing without an election.*

More information related to the process for forming districts in Washington State is provided on the MRSC website (MRSC 2021).

So, formation of a special purpose district in either Idaho or Washington State could be considered as mechanism to finance the Palouse Basin project. Consideration of the details of which form of special district would be required and the detailed implementation processes is beyond the scope of this preliminary financing study. Based on the reference documents and websites noted in this section, some forms of special districts require both votes of the governing bodies and also referenda votes of the voting age populations within the boundaries of the district that would be created.

### 3.2.3 Selecting the Primary Project to Implement

PBAC is currently evaluating four alternatives, each comprised of various sub-elements, to stabilize the declining aquifer. The following section provides brief summaries of these four alternatives. Each of the four alternatives vary in terms of project location and footprint that relate to the city, county, and state boundaries crossed. For example, one alternative has four distinct project elements in isolated locations, whereas another alternative has project infrastructure located in Washington and a water delivery conveyance system routed through counties and cities in both Washington and Idaho. Selection of a preferred alternative to implement will provide different answers to the governance questions and related elements of the organizational funding strategy.

#### 3.2.3.1 Summary of Water Supply Alternatives

The following provides a brief summary of the four water supply alternatives being contemplated to stabilize the declining groundwater aquifer. The estimated project capital cost is provided for each alternative based on the values reported in the *Palouse Groundwater Basin Water Supply Alternatives Analysis Report* (PBAC 2017).

##### 3.2.3.1.1 Alternative 1 ($78 Million)

This regional project would supply water from a new intake on the Snake River located in Washington to the cities of Pullman and Moscow for water supply and to replace a portion of existing irrigation water for the cities and universities. A new water treatment plant would be constructed south and in close proximity to Pullman. New pump stations and pipelines would be constructed to convey water from the Snake River intake to the treatment plant and then to Pullman and Moscow for connections to their respective existing water distribution systems.

##### 3.2.3.1.2 Alternative 2 ($60 Million)

Alternative 2 is also a regional project that would supply water from a new intake on the North Fork Palouse River located in Washington to the cities of Pullman and Moscow for water supply and to replace a portion of existing irrigation water for the cities and universities. Water diverted from the river would be conveyed to a new water treatment plant that would be constructed north of Pullman. The water would then be conveyed to both Pullman and Moscow for connections to their respective existing distribution systems.

Additionally, Alternative 2 includes a second diversion from either Paradise Creek or the South Fork of the Palouse to capture the winter and spring high runoff flows for treatment and active injection of the treated water into the aquifer recharge location in Moscow.

##### 3.2.3.1.3 Alternative 3 ($86 Million)

Alternative 3 is comprised of two distinct sub-alternative projects: one new storage reservoir located north of Moscow and one new river diversion for use by Pullman. The project north of Moscow consists of a new storage reservoir on Flannigan Creek, conveyance to a new treatment plant immediately north of Moscow, and delivery to Moscow and University of Idaho existing water systems. The project located by Pullman consists of a new intake on the South Fork Palouse River for treatment and direct use in the Pullman and Washington State University water distribution systems.

##### 3.2.3.1.4 Alternative 4 ($73 Million)

Alternative 4 is a combination of several sub-alternative projects and initiatives. The projects would be used to supply a portion of the water demands in Pullman and Moscow and to offset the existing irrigation for both of the cities and universities. One project entails a new intake on Paradise Creek near Moscow, treatment, and active aquifer recharge into wells in Moscow. A second project consists of a new diversion from South Fork Palouse River in Pullman for treatment and active injection of the treated water to Aquifer Storage and Recovery wells in Pullman. Another project in Pullman involves an upgrade to the Pullman Wastewater Treatment Plant (WWTP) to produce Class A reclaimed water for distribution and reuse at selected sites within Pullman and potentially at Washington State University. A separate wastewater reuse project is envisioned in Moscow that would include the additional use of Class A reclaimed water from the Moscow WWTP for passive aquifer recharge in Moscow. Lastly, Alternative 4 includes water conservation measures to reduce landscape irrigation an additional 15 percent beyond the baseline projection. The water conservation initiative would be implemented in both cities and universities.

#### 3.2.3.2 Different Governmental Entities Engaged

The selection of one of the four engineering options described above will inform the identification of the existing or future entities that should be involved in financing and repaying any debt for the capital costs associated with implementing the selected solution and paying for any ongoing operating costs. For example, if the selected option involves construction only in Idaho and provides benefits only to Idaho property owners, then the financing of capital costs and payment of operating costs should be borne by existing entities or potential future entities that might be established within the State of Idaho.

### 3.2.4 Continuing Role for PBAC in Securing Grants and Financial Contributions from Local Agencies for Near-Term Planning and Coordination Efforts

PBAC has served as a forum for the stakeholders from the government agencies and other groups interested in supporting planning and development of Palouse Basin project opportunities and in securing planning grants and seed money from the local government agencies to support these planning efforts. Because of its unique ability to provide a forum for this diverse group of stakeholders, PBAC should have an important continuing role in advancing plans for the project and in providing a forum for stakeholders to discuss and resolve issues that will continue to arise as plans for the project continue to form.

Even though PBAC cannot impose taxes and fees or issue bonds, it can work with the selected entity or entities that are selected to implement the capital financing program to help advance plans for the project. And, PBAC may be able to continue to secure grants to help advance the planning effort and secure additional funding to support its important outreach for and support of the planning process.

# 4. Preliminary Findings for Step 2: Funding Options and Relevance to the Program

As detailed in Section 3, there are a number of possibilities regarding which entity or entities might be selected to be responsible for financing the Palouse Basin project(s). And, some of those entities have different financing and funding powers, based on state statutes and local agreements and arrangements. Until a decision is made as to which project to implement and which entities will be responsible for the financing and funding associated with the project, a definitive list of financing and funding options cannot be made. So, this section of the technical memorandum should be considered a *preliminary* identification of funding and financing options to form a successful funding strategy that should be revisited and revised as appropriate after those important decisions on the engineering option and financing entities are made.

## 4.1 Options that Can be Combined to Form a Successful Strategy

PBAC has already secured some planning grant money plus contributions from some of the local agencies to support the development of project options and coordination of the stakeholder groups. This section describes the range of funding and financing mechanisms that have been identified as potentially viable candidates to help finance the full Palouse Basin project, depending on the project option selected and the entity or entities that will be responsible for the capital project financing.

### 4.1.1 Grants

While grants typically are not available to fully fund a large program such as the $60 million to $80 million Palouse Basin project, there are some grant programs that may be available to cover a portion of the project's capital costs. As a point in time illustration of potentially applicable grants, Jacobs conducted a key word search on "water resource" projects that local agencies in Idaho and Washington State could apply for through the GrantFinder service that the firm subscribes to. As shown in Table 4-1, the search

identified more than ten potentially applicable grants that PBAC could further research as potential funding sources.

**Table 4-1. Illustration of Potentially Applicable Grants**

| Grant Name | Funder Type | Administering Authority | Total Funding Available |
|---|---|---|---|
| Drinking Water State Revolving Fund – Preconstruction Grant (Washington) | State | Washington State Department of Health | $20,000,000 |
| Drinking Water State Revolving Fund – Consolidation Grant (Washington) | State | Washington State Department of Health | $2,000,000 |
| WaterSMART: Title XVI Congressionally Authorized Water Reclamation and Reuse Projects | Federal | U.S. Department of the Interior (DOI) | N/A |
| WaterSMART Grants: Water Marketing Strategy Grants | Federal | U.S. Department of the Interior (DOI) | $3,000,000 |
| Five Stare & Urban Waters Restoration Program | Foundation | National Fish and Wildlife Foundation (NFWF) | $1,700,000 |
| Dire States Equipment Grant | Corporate Foundation | CASE Construction Equipment | $25,000 |
| WaterSMART: Water and Energy Efficiency Grants | Federal | U.S. Department of the Interior (DOI) | N/A |
| Water Conservation Field Services Program – Upper Colorado Region | Federal | U.S. Department of the Interior (DOI) | $300,000 |
| WaterSMART: Small-Scale Water Efficiency Projects Grants | Federal | U.S. Department of the Interior (DOI) | N/A |
| Drought Resiliency Projects Grants | Federal | U.S. Department of the Interior (DOI) | $3,250,000 |
| WaterSMART: Cooperative Watershed Management Program | Federal | U.S. Department of the Interior (DOI) | N/A |
| WaterSMART: Water Recycling and Reuse Research under the Title XVI Water Reclamation and Reuse Program | Federal | U.S. Department of the Interior (DOI) | $2,000,000 |
| Safe Drinking Water Action Grants | State | Washington State Department of Ecology | N/A |

### 4.1.2 Municipal Agency or Special Purpose District Funds

There are a number of funding and financing mechanisms at the local agency level that could be used by existing entities, such as the City of Pullman or the City of Moscow, or a new special purpose district could use to provide funding, as described below.

#### 4.1.2.1 Cash (Equity) Sources

These local agencies could use cash on hand, such as general fund reserves, to provide funding for the project. In addition, they could impose fees and taxes, based on the specific powers granted based on how the agencies were formed/constituted under applicable state legislation.

#### 4.1.2.2 Municipal Bonds

The cities could issue municipal bonds to cover a portion of the Palouse Basin's project costs; a newly formed special purpose district could also issue bonds if formed in a manner that enables such powers under the provisions of applicable state statutes. As described in more detail in Section 3.2.1, using municipal bonds will depend on both the ability and willingness of the local agencies to issue bonds for the project.

### 4.1.3 State Level Funding

As detailed below, state contributions could come from both direct state appropriations of funds or through allocation of grant and loan funds administered through state agencies.

#### 4.1.3.1 State Capital Budget Appropriation

PBAC and the associated stakeholders could lobby their state legislators for the portions of Idaho and Washington State affected by the project to develop and support passage of direct appropriations for the project in state budget bills.

#### 4.1.3.2 State-agency Administered Funding, including State Revolving Loan Funds Loans

There are a number of grant and loan programs administered through Idaho and Washington State agencies that address program needs like those addressed by the Palouse Basin project. Competitive applications would need to be submitted for these programs, and the project would compete with a range of other candidate projects throughout the two states. Some of the key relevant state programs are described in the following section.

##### 4.1.3.2.1 Idaho Water Resource Board

As taken from their website, the Idaho Water Resource Board (IWRB) is "responsible for the formulation and implementation of a state water plan, financing of water projects, and the operation of programs that support sustainable management of Idaho's water resources" (IWRB 2021). The IWRB is responsible for administering funds from one primary source, state legislature funding, and a recently added source, a portion of the American Infrastructure Recovery Act targeted for water resource projects. The IWRB currently has approximately $70 million available to fund several identified projects.

Nested within the state legislature funding stream, there are three funds that the IWRB manages:

1) Revolving Development Fund
    a) This is the older fund
    b) Issues loans to irrigation districts and other entities for infrastructure principal repayments
    c) Issues $7 million to $9 million annually in loans
2) Secondary Aquifer Fund
    a) Funds aquifer recharge, cloud seeding, groundwater monitoring, and modeling-type projects
    b) Funding from cigarette tax resulting in approximately $5M of available annual funds.

3) Grant Fund
    a) Traditionally has administered approximately $1 million annually for flood control boards
    b) Has not administered any additional money for the past 15 years
    c) Recently funded $70 million through legislative funding for the large infrastructure projects that have been presented and lobbied

Through the American Rescue Plan Act of 2021, Idaho is the recipient of $1.9 billion. The IWRB intends to maximize the application of this funding and has formed two committees: Broadband Committee and Water Committee.

Historically, a water resource project on the scale of those being contemplated in the Palouse Basin would have been financed 100 percent outside of the IWRB. However, with the recent infusion of funding, both from state legislature and federal appropriations, the IWRB has money available for projects that is has not typically been able to access.

Through the efforts of PBAC and its members, the IWRB is very aware of the Palouse Basin project and has it on their list of priority projects. The timing of advancing the Palouse Basin project to secure IWRB funding through its various funding streams is ideal. The IWRB is generally supportive of setting aside money for planning and design but may be receptive to allocating funds for construction as well given the recent influx of funds to administer.

#### 4.1.3.2.2 Idaho Department of Environmental Quality State Revolving Loan Funds

The Idaho Department of Environmental Quality (DEQ) is responsible for administering the State Revolving Loan Funds (SRF) program funded primarily through the U.S. Environmental Protection Agency (EPA) Clean Water State Revolving Fund (CWSRF). The CWSRF program is a federal-state partnership that provides communities with low-cost financing for a wide range of water quality infrastructure projects. DEQ receives a portion of the national funds that EPA is allocated through congressional appropriations based on set formulas. Idaho is required to provide a 20 percent match to the CWSRF funding.

The DEQ SRF program provides below-market-rate interest loans to help repair or build new drinking water or wastewater facilities. Loans of up to 100 percent of project costs may be awarded for project design and/or construction. The length of the repayment period may vary with a maximum repayment duration of 30 years from project completion.

Many of the projects being contemplated by PBAC would be applicable for loan financing through the DEQ SRF program. Details of the process are described in the *Drinking Water Loan Account Handbook* (DEQ 2017).

#### 4.1.3.2.3 Washington Department of Health State Revolving Loan Funds

The Washington State Department of Health, Drinking Water State Revolving Fund (DWSRF) makes funds available to drinking water systems to pay for infrastructure improvements and the program if funded through federal and state money (Washington State Department of Health 2021a). Within the DWSRF, three funding programs are applicable to the PBAC project:

1) Preconstruction Loans
    a) Applicable to private and publicly owned community and not-for-profit non-community water systems
    b) Eligible for preparation of planning documents, engineering reports, construction documents, permits, cultural reports, and environmental reports

c) $500,000 maximum per jurisdiction; $3 million available to award each year

d) Zero percent annual interest rate, 2 percent loan origination fee, 2-year time of performance, and 10-year repayment period

2) Construction and Design/Construction Loans

a) Applicable to private and publicly owned community and not-for-profit non-community water systems

b) Eligible for drinking water system infrastructure projects aimed at increasing public health protection

c) $5 million maximum per jurisdiction; $50 million expected to be available in 2021 funding cycle

d) One percent loan fee, 1.25 to 1.75 percent interest rate, loan repayment period is 20 years or life of the project, whichever is less

3) Consolidated Feasibility Study Grant

a) Applicable for not-for-profit community water system, county, public utility district, or water districts

b) Eligible to study the possibility of restructuring or consolidating water systems. Activities include water system planning, feasibility studies, public outreach and meetings, and engineering design

c) $30,000 maximum per project; $150,000 available to award

d) Cancelled for 2021

#### 4.1.3.2.4 Washington State Department of Ecology Safe Drinking Water Action Grants

Per the Washington State Department of Ecology website, "These grants are for local governments to provide safe drinking water to people living in areas that are or may be affected by contamination from hazardous waste sites" (State of Washington Department of Ecology 2021b).

A Safe Drinking Water Action Grant is:

1) Applicable to local governments that are in compliance with the New Permit Condition (RCW 70.105D.200(5)) of obtaining all of the required permits for the action within one year of the effective date of the enacted budget.

2) Eligible project types include:

a) Developing and replacing water supply sources, including pumping and storage facilities, source meters, and related equipment

b) Lines between major system components, including inter-ties with other water systems

c) Treatment equipment/facilities

d) Distribution lines from major system components to customers or service connections

e) Bottled water until a safe, permanent source is in place

f) Fire hydrants

g) Service meters

h) Project inspection, engineering, and administration

i) Individual service connections, including fees, if property owners provide a majority of the cost

j) Closed drinking water wells that are an environmental safety or health hazard under state law

k) Interim financing until local government issues revenue bonds

l) Costs the health department deems necessary to operate a system that complies with federal and state standards, or that are required in the coordinated water system plan standards

m) Costs to protect a public water system from contamination or locate contamination sources

3) There is no set limit for how much funding is awarded. The amount of funding is established with each enacted capital budget.

4) The amount of matching funds required is 10 percent to 50 percent, but all eligible investigation costs may not be funded.

#### 4.1.3.2.5 Washington State Department of Ecology Streamflow Restoration Competitive Grants

Incorporating a streamflow restoration component into alternative development is a method that could increase grant funding opportunities for PBAC.

Washington State Department of Ecology Streamflow Restoration Competitive Grants are intended to help recipients improve streamflow and aquatic resources. Grant funding is awarded statewide on a competitive basis. The types of projects prioritized vary from one grant round of funding to the next, but projects are generally ranked higher if they quantitively provide benefits to streamflow or improve instream resources (State of Washington Department of Ecology 2021c).

For example, in the Yakima River Basin, the Yakima River Basin Integrated Plan partners are successful in obtaining funding for water supply projects that include ecosystem services. Ecosystem services create ecosystem benefits that may include increased water supplies for agriculture, municipalities, and fish and wildlife. There is a higher likelihood that proposals will be ranked/scored higher if they provide for both ecosystem services and ecosystem benefits. Additionally, providing both ecosystem services and ecosystem benefits likely improves coordination with partners and stakeholders, therefore generating additional support for a project, which could result in a higher ranking/score.

A Streamflow Restoration Grant is:

1) Applicable to tribal governments with reservation lands or treaty rights within Washington, public entities (state and local governments and quasi-governments), and nonprofit organizations

2) Eligible project types include but are not limited to:

   a) Water right acquisitions
   b) Water storage
   c) Altered water management or infrastructure
   d) Watershed function, riparian, and fish habitat improvements
   e) Environmental monitoring
   f) Feasibility studies

3) There is no set limit for how much funding is awarded. The amount of funding is established with each enacted capital budget (2020 funding cycle was $22 million).

4) No matching funds are required.

### 4.1.4 Federal Funding

As described in this section, there are several forms of federal financing that may be applicable for the Palouse Basin project.

#### 4.1.4.1 Direct Appropriations

Direct appropriations, sometimes called "earmarks," are funds made available for a specific agency's capital project or program as part of a federal appropriations bill. For a number of years, earmarks were not used as a funding mechanism by agreement of the congressional leadership. In 2021, the use of earmarks was reinitiated. If this continues in future years, lobbying efforts by local stakeholder groups and public officials to the congressional delegations representing the Palouse Basin project's service area constituents could seek to secure direct federal funding for a portion of the project's cost.

#### 4.1.4.2 Existing Federal Programs

Applications for funding support could be made to federal grant and loan programs for support for the Palouse Basin project. One program that could be attractive is the Water Infrastructure Finance and Innovation Act (WIFIA) loan program administered by the U.S. EPA headquarters office in Washington, D.C. The WIFIA loan program has a number of potentially useful attributes when compared with other bond and loan borrowing options, including:

- Low interest rate tied to the U.S. Treasury Rate for state and local governments at the time the loan is closed
- Ability to delay repayment up to 5 years after substantial completion of construction
- Total financing period can extend to 35 years

A WIFIA loan can support up to 49 percent of a project's costs. Figure 4-1 illustrates how the features of the WIFIA program, including lower interest rates and opportunities to delay repayment for the WIFIA financed portion of the project, could help ease into the fee or tax increases needed to pay for the Palouse Basin project.

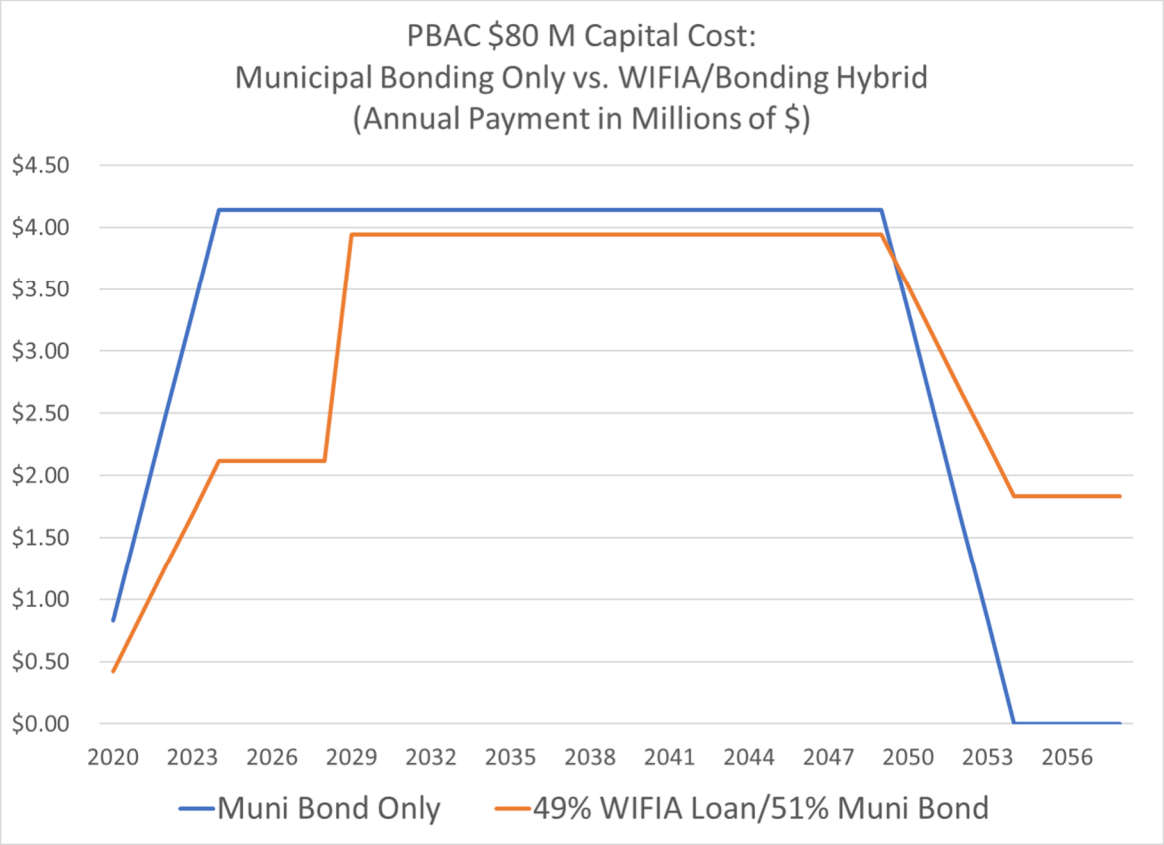


**Figure 4-1. Comparison of Repayment of $80 Million for Two Project Financing Scenarios: Municipal Bond Only and Municipal Bond/WIFIA Loan Hybrid Option**

#### 4.1.4.3 2021 Federal Stimulus Legislation

Two unique pieces of federal legislation during 2021 will make significant amounts of federal stimulus funding available to state and local agencies:

- The American Rescue Plan Act of 2021, which was passed by Congress and signed into law by President Biden on March 12, 2021, makes $350 billion in revenues available to state and local government agencies throughout the United States. While a central focus for these revenues is to address health and vaccination program needs arising from the COVID-19 pandemic, there is wide discretion in how local agencies can use the funds made available through this legislation.
- In addition, an infrastructure bill, The American Jobs Plan Act, is working its way through Congress and is expected to be passed and signed into law by the President sometime during the summer or early fall of 2021. The current working version of this bill has $56 billion for water, sewer, and stormwater infrastructure, most of which are anticipated to be distributed to specific projects by the state agencies that administer the SRF programs, including the Idaho and Washington State agencies discussed in Section 4.1.3.2.

The Palouse Basin project is likely not far enough along in development and in resolution of the governance issues identified earlier in this memorandum to take advantage of the stimulus funding for the large capital portion of the project's costs. However, some of the funding might be available for

continuation of the planning for the project and for some of the design/engineering efforts needed for the project:

- To secure funding from the state/local portion of the American Rescue Plan Act, PBAC and other project stakeholders would need to appeal to the local and county governments receiving funding from this act to allocate a portion of the funds for the continuing development of the project.
- To secure funding from the portion of the American Jobs Plan Act that is anticipated to be available for water projects, an application would need to be made to the state agencies identified in Section 4.1.3.2.

## 4.2 Preliminary Strategy Table

Figure 4-2 presents a preliminary strategy table that shows how the funding and financing mechanisms described herein can be combined into an overall financing strategy for the Palouse Basin project. The strategy should be revisited and refined once the engineering project and its long-term financing entities have been identified and selected.

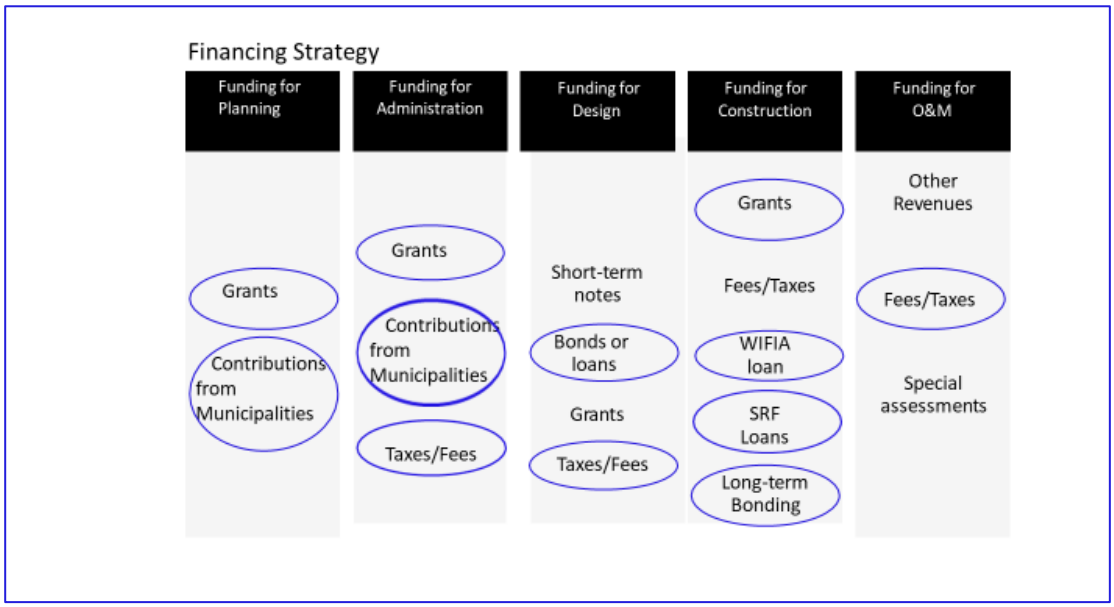


**Figure 4-2. Preliminary Financing Strategy for PBAC Project**

# 5. Three Key Decisions Required to Enable Substantial Further Progress

For reasons detailed throughout this memorandum, there are several key decisions that need to be made to enable substantial further progress in defining the financing strategy. Specifically, the following next steps are recommended to allow identified parties to issue debt or secure loans or grants for the implementation phase costs, including construction:

1) Identify and weigh the goals and objectives of the financing plan, which should include PBAC and all other relevant stakeholders of the financing program.
2) Decide which of the four engineering options will be implemented, because, as detailed in this memorandum, the selection of the engineering option affects which financing mechanisms are relevant.
3) Decide which entity or combination of entities will be responsible for addressing the long-term financing that will be needed for the implementation phase construction costs of the project.

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